

School of Engineering Technology

Bulletin 1990–1992



**Northeastern
University**

**School of
Engineering Technology
Bulletin**

1990–1992

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About This Bulletin

This *Bulletin* offers information about the evening and weekend programs available at Northeastern University's School of Engineering Technology. (If you are interested in Northeastern University's full-time day programs, call the Office of Undergraduate Admissions, 617-437-2200.)

For prospective students, we hope that after reading this publication you'll agree that a career in engineering technology can be exciting and challenging. As you'll soon discover, our evening and weekend programs are designed to enable you to pursue a career and an education at the same time.

Students already attending the School of Engineering Technology use the *Bulletin* as an important guide to the resources and policies of the University. In addition, students use the degree program descriptions to plan and track their academic careers.

The *School of Engineering Technology Bulletin* is divided into two parts: "Teaching Tomorrow's Technologists Today" and "Northeastern University."

"Teaching Tomorrow's Technologists Today" defines engineering technology and introduces you to the School of Engineering Technology. This section also contains descriptions of each program and course we offer.

The "Northeastern University" section reviews the benefits—the services and resources—that attending the largest private university in the nation provides. We present the University's administrative and academic policies, as well as financial aid and scholarship opportunities.

Taking the Next Step

If you are planning to attend the School of Engineering Technology for the first time, please complete and return the enclosed Student Data

Card. The information on the card enables us to open a student file for you that can be used by the school's academic counseling staff whenever you request assistance.

Because we have an open enrollment policy, you can register for courses without formally applying for admittance to a program. In fact, our students earn sixteen credits before petitioning for entrance to a program. If you are a transfer student, you may already be eligible to matriculate. For more details, carefully review the "Admissions" section. (See page 57.)

A Fee Schedule and Academic Calendar should have been enclosed with this *Bulletin*. The insert includes the current academic calendar, registration dates, and a list of the University's fees.

Before registration begins, obtain a copy of the *University College and School of Engineering Technology Schedule* for the next academic quarter. The *Schedule* indicates which courses will be offered each quarter, and when they will meet. Note that, since not all courses are offered every quarter, you must plan your course load for the coming academic year, not just the next quarter, by referring to the program and course descriptions contained in this *Bulletin*. For more details, review the "Registration" section. (See page 58.)

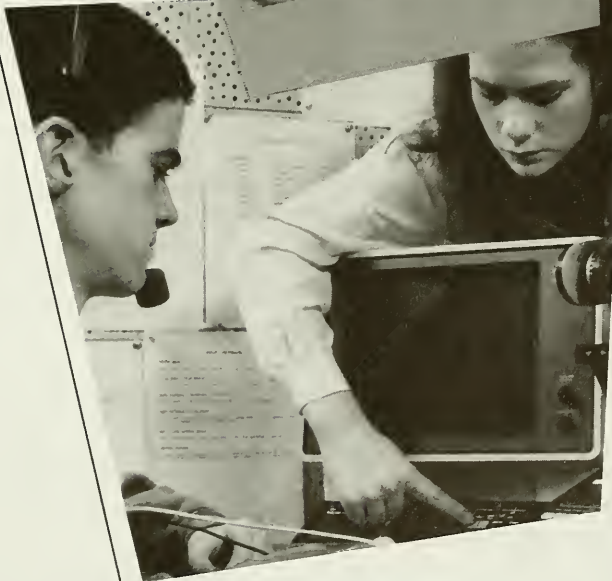
Finding Additional Help

If you have any questions, or are missing any of the forms mentioned in this *Bulletin*, call the School of Engineering Technology office, 617-437-2500.



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Teaching Tomorrow's Technologists Today



An Introduction to Engineering Technology

Janet Lampke is a branch manager for Northrop's Precision Product Division. Steve Sweeney is chair and chief executive officer of the Boston Edison Company. Susan Jenkins is a technical trainer for Unitrode. David Varney is a senior project engineer for Texas Instruments.

At first glance, you may not think these professionals have a lot in common. However, the exact opposite is true: they have all built exciting careers from degrees in engineering technology.

What is engineering technology?

Engineering technology is the application of engineering principles and modern technology to help solve or prevent technical problems. Unlike engineering, which is primarily analytical and theoretical, engineering technology centers on practical applications.

Engineering technology is a relatively new discipline. Before engineering technology programs like Northeastern's emerged, people with scientific or technical ambitions had a difficult decision to make: what kind of education should they pursue? College-bound students had three choices.

Choice number one was selecting a major from among the pure sciences: physics, chemistry, or biology. However, these majors are only appropriate for people interested in pursuing additional degrees, laboratory research, or careers in education.

The second option was selecting from among the engineering science majors: civil engineering, electrical engineering, or mechanical engineering. But engineering science demands highly developed analytical skills, and prepares people for careers conceptualizing and designing technical devices or systems.

The third choice was deciding not to attend college, but to enroll in a technical or vocational school. This route is best suited for people interested in the trades: that is, for people who want careers physically building or repairing machinery.

Engineering technology curricula introduced a fourth option. The programs are designed to meet the growing need created by our technolog-

ical revolution for college-educated problem solvers who can bridge the gap between the blueprints and the production line. These men and women can help engineers and tradespeople work effectively together.

Engineering technology programs include scientific and engineering principles relevant to your chosen field: you will come to understand why a system is designed in a particular fashion and how it works. This educational focus is often absent from a technical or vocational school education.

In addition, engineering technology students acquire hands-on technical skills, an element given little emphasis in engineering science curricula. These technical skills will enable you to solve production and system implementation problems, and help you to explain your solutions to tradespeople.

Who are engineering technologists?

People who are part of the technology workplace include scientists, engineers, technologists, technicians, and tradespeople. All of these professionals have specialized educations or training beyond the high school level, and often have to work together as a team. As on any team, the players have different roles that are equally important.

Scientists are concerned with advancing our understanding of the laws of nature and our knowledge of scientific principles. The scientist is primarily involved with research.

Engineers employ the scientific knowledge developed by scientists in planning, designing, and constructing technical devices and systems. The engineer is a developer of technological innovations.

Engineering technologists work closely with engineers in coordinating people, material, and machinery in order to achieve the specific goals of a particular project. The engineering technologist often ensures that the engineer's designs and instructions are implemented efficiently and according to accepted practices.

School of Engineering Technology

You have a special kind of ambition that allows you to work full-time and attend University after hours. The faculty and administration of the School of Engineering Technology share, admire, and respect your desire for professional and personal growth through higher education. We are as committed as you. We can help you achieve your goals.

When you enroll in the School of Engineering Technology, you are entering one of the oldest and finest undergraduate engineering technology programs in the country. Northeastern University established its first engineering technology program within the Polytechnic School in 1916. During 1926, the program was reorganized under a new entity within Northeastern: Lincoln Institute, later changed to Lincoln College. The program's most recent transformation occurred in 1984, when Lincoln College became the School of Engineering Technology.

Today's School of Engineering Technology is a unit of Northeastern University's College of Engineering. Although we offer courses at several locations and through the University's television system, Network Northeastern, our central offices are in the Snell Engineering Center on the Boston campus.

All of our engineering technology programs require laboratory courses that are conducted in facilities on the Boston campus. We've done our best to ensure that you can get the most out of these courses by equipping our laboratories with the latest available technology. We continue to acquire laboratory equipment that allows us to conduct experiments that were until recently impractical or impossible.

As a student at Northeastern's School of Engineering Technology, you are taught by faculty whose impressive professional experience can provide you with practical insights into the field.

In addition to the many resources offered to you as a School of Engineering Technology student, you are a fully vested member of the Northeastern University community. As such, you are invited to take advantage of the many assets the University provides. We encourage you to

read the "Profile of Northeastern" section of this *Bulletin* for details of the University's facilities.

The School of Engineering Technology offers day programs in engineering technology to full-time students, as well as the evening and weekend programs described in this publication. All of our programs are at the undergraduate level, leading to either an associate's or a bachelor's degree.

Our fifteen evening and weekend degree programs span the following areas of concentration.

- Civil engineering technology, including architectural; environmental; structural; surveying and highway; and mechanical-structural engineering technology
- Computer technology
- Electrical engineering technology
- Energy systems
- Manufacturing engineering technology
- Mechanical engineering technology, including aerospace maintenance engineering technology
- Telecommunications

We welcome your interest in Northeastern's School of Engineering Technology. In the following pages, you can learn about the specifics of each of our programs.

Degree Program Descriptions

Overview

This section gives a description of each program offered by the School of Engineering Technology. Accompanying each description are specimen curricula for the majors offered within the specific program. The specimens list the degree's required courses and the sequence in which you should complete them. The specimens assume that you will initially enroll in courses during the fall quarter. If you are a transfer student, take time off, or begin the program in a different quarter, please meet with one of our academic advisers. The adviser will help you take courses in a sequence that is academically sound and that will fulfill your degree program's graduation requirements. For more information about the program descriptions and curricula, contact an adviser at 617-437-2500.

Civil Engineering Technology Programs

Civil engineering professionals plan and construct a variety of structures and public works. The civil engineering technologist's major functions include preparing surveys (topographical, geological, traffic); designing structures (buildings, bridges, dams); planning municipal systems (water, sewers, flood control); and developing transportation facilities (highways, railways, waterways).

We offer associate's degree programs in architectural engineering technology; environmental engineering technology; structural engineering technology; and surveying and highway engineering technology. A bachelor's degree program in mechanical-structural engineering technology is also offered.

The associate's degree program in architectural engineering technology offers study in planning, designing, and constructing buildings.

Career opportunities are with architectural groups, consulting engineering firms, and government agencies.

The associate's degree program in environmental engineering technology offers you the opportunity to prepare for responsibilities related to designing, constructing, and supervising municipal plants and systems that control the storage and distribution of water. Students may also prepare for responsibilities associated with the disposal of sewage and waste in urban areas, with an emphasis on preventing contamination and pollution. Career opportunities are with town, city, and state public works departments, private engineering consultants, architects, contractors, and engineering firms.

The associate's degree program in structural engineering technology offers the opportunity to prepare for planning, designing, and supervising the construction of buildings, bridges, foundations, flood-control projects, and other fixed structures. Professional opportunities include consulting engineering firms, architectural groups, contractors, railroads, government agencies, and the military.

The associate's degree program in surveying and highway engineering technology offers opportunities in the preparation and calculation of preliminary and legal surveys required for both basic and complex projects. These projects can include subdivision work, individual lot layouts, highway layouts, and projects relating to sewer systems, pipelines, power transmission lines, dams, reservoirs, and aqueducts. Career opportunities are with independent surveying companies, civil engineering companies, highway transit, railroad planning groups, cartographers, construction companies, and contractors.

The bachelor's degree program in mechanical-structural engineering technology offers opportunities to prepare for both the planning and constructing of structures such as buildings, bridges, and docks, and designing and producing dynamic machine tools, machinery, and other mechanical devices. Career opportunities are with architectural, construction, civil, and mechanical professions and companies.

Architectural Engineering Technology
(Major Code 025)

The Architectural Engineering Technology Program leads to the associate in engineering degree. Degree candidates must

earn 102 credits by completing the following four-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4171	Engineering Graphics 2
		MTH	4108	Pre-Calculus
	Spring	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4173	Physics Lab 1
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4174	Physics Lab 2
Third-Year Courses	Fall	CHM	4111	General Chemistry 1
		ECN	4115	Economic Principles and Problems 1
		MET	4301	Mechanics A
	Winter	ECN	4116	Economic Principles and Problems 2
		ENG	4111	Critical Writing 2
		MET	4314	Stress Analysis A
	Spring	CET	4321	Introduction to Structural Design
		MET	4315	Stress Analysis B
Fourth-Year Courses	Fall	CET	4324	Structural Analysis 1
		CET	4390	Technology of Modern Architecture
	Winter	CET	4371	Concrete Design 1
		CET	4391	Architectural Design 1
	Spring	CET	4331	Steel Design 1
		CET	4392	Architectural Design 2

Environmental Engineering Technology

(Major Code 011)

The Environmental Engineering Technology Program leads to the associate in engineering degree. Degree candidates must

earn 102 credits by completing the following four-year curriculum.

First-Year Courses	<i>Fall</i>	GET 4170	Engineering Graphics 1
		MTH 4107	College Algebra
	<i>Winter</i>	GET 4171	Engineering Graphics 2
		MTH 4108	Pre-Calculus
	<i>Spring</i>	GET 4100	Computer Programming for Engineering Technology
		MTH 4120	Calculus 1
Second-Year Courses	<i>Fall</i>	MTH 4121	Calculus 2
		PHY 4117	Physics 1
	<i>Winter</i>	ENG 4110	Critical Writing 1
		PHY 4118	Physics 2
		PHY 4173	Physics Lab 1
	<i>Spring</i>	GET 4306	Technical Communications
		PHY 4119	Physics 3
		PHY 4174	Physics Lab 2
Third-Year Courses	<i>Fall</i>	CHM 4111	General Chemistry 1
		ECN 4115	Economic Principles and Problems 1
		MET 4301	Mechanics A
	<i>Winter</i>	ECN 4116	Economic Principles and Problems 2
		ENG 4111	Critical Writing 2
		MET 4314	Stress Analysis A
	<i>Spring</i>	MET 4315	Stress Analysis B
		MET 4370	Fluid Mechanics A
Fourth-Year Courses	<i>Fall</i>	CET 4324	Structural Analysis 1
		CET 4361	Materials and Soil Mechanics
	<i>Winter</i>	CET 4350	Environmental 1
		CET 4371	Concrete Design 1
	<i>Spring</i>	CET 4351	Environmental 2
		CET 4393	Construction Administration

Structural Engineering Technology (Major Code 012)

The Structural Engineering Technology Program leads to the associate in engineering degree.

Degree candidates must earn 102 credits by completing the following four-year curriculum.

First-Year Courses	<i>Fall</i>	GET 4170	Engineering Graphics 1
		MTH 4107	College Algebra
	<i>Winter</i>	GET 4171	Engineering Graphics 2
		MTH 4108	Pre-Calculus
	<i>Spring</i>	GET 4100	Computer Programming for Engineering Technology
		MTH 4120	Calculus 1
Second-Year Courses	<i>Fall</i>	MTH 4121	Calculus 2
		PHY 4117	Physics 1
	<i>Winter</i>	ENG 4110	Critical Writing 1
		PHY 4118	Physics 2
		PHY 4173	Physics Lab 1
	<i>Spring</i>	GET 4306	Technical Communications
		PHY 4119	Physics 3
		PHY 4174	Physics Lab 2
Third-Year Courses	<i>Fall</i>	CHM 4111	General Chemistry 1
		ECN 4115	Economic Principles and Problems 1
		MET 4301	Mechanics A
	<i>Winter</i>	ECN 4116	Economic Principles and Problems 2
		ENG 4111	Critical Writing 2
		MET 4314	Stress Analysis A
	<i>Spring</i>	CET 4321	Introduction to Structural Design
		MET 4315	Stress Analysis B
Fourth-Year Courses	<i>Fall</i>	CET 4324	Structural Analysis 1
		CET 4361	Materials and Soil Mechanics
	<i>Winter</i>	CET 4325	Structural Analysis 2
		CET 4371	Concrete Design 1
	<i>Spring</i>	CET 4331	Steel Design 1
		CET 4393	Construction Administration

Surveying and Highway Engineering Technology (Major Code 013)

The Surveying and Highway Engineering Technology Program leads to the associate in engineering degree. Degree candidates must

earn 102 credits by completing the following four-year curriculum.

First-Year Courses	<i>Fall</i>	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	<i>Winter</i>	GET	4171	Engineering Graphics 2
		MTH	4108	Pre-Calculus
	<i>Spring</i>	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	<i>Fall</i>	MTH	4121	Calculus 2
		PHY	4117	Physics 1
	<i>Winter</i>	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4173	Physics Lab 1
	<i>Spring</i>	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4174	Physics Lab 2
Third-Year Courses	<i>Fall</i>	CHM	4111	General Chemistry 1
		ECN	4115	Economic Principles and Problems 1
		MET	4301	Mechanics A
	<i>Winter</i>	ECN	4116	Economic Principles and Problems 2
		ENG	4111	Critical Writing 2
		MET	4314	Stress Analysis A
	<i>Spring</i>	MET	4315	Stress Analysis B
		MET	4370	Fluid Mechanics A
Fourth-Year Courses	<i>Fall</i>	CET	4301	Plane Surveying
		CET	4316	Land Use Planning
	<i>Winter</i>	CET	4302	Geodetic Surveying
		CET	4307	Legal Aspects of Surveying
	<i>Spring</i>	CET	4303	Route Surveying
		CET	4311	Highway Engineering

Mechanical-Structural Engineering

Technology (Major Code 015)

The Mechanical-Structural Engineering Technology Program leads to the bachelor of engineering technology degree. The program is accredited by the Technology Accreditation

Commission of the Accreditation Board for Engineering and Technology. Degree candidates must earn at least 186 credits by completing the following seven-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4171	Engineering Graphics 2
		MTH	4108	Pre-Calculus
	Spring	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4173	Physics Lab 1
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4174	Physics Lab 2
Third-Year Courses	Fall	CHM	4111	General Chemistry 1
		MET	4301	Mechanics A
		MTH	4122	Calculus 3
	Winter	MET	4302	Mechanics B
		MET	4314	Stress Analysis A
	Spring	MET	4370	Fluid Mechanics A
		MET	4380	Materials A
Fourth-Year Courses	Fall	ECN	4115	Economic Principles and Problems 1
		MET	4315	Stress Analysis B
		MET	4390	Measurement and Analysis Lab
	Winter	ENG	4111	Critical Writing 2
		MET	4371	Fluid Mechanics B
		MET	4391	Technology Lab A
	Spring	CET	4321	Introduction to Structural Design
		MET	4392	Technology Lab B
		(		) Social Science/Humanities Elective

Fifth-Year Courses	<i>Fall</i>	CET 4324	Structural Analysis 1
		MET 4303	Mechanics C
	<i>Winter</i>	CET 4325	Structural Analysis 2
		()	Technical Elective
	<i>Spring</i>	CET 4331	Steel Design 1
		()	Technical Elective
Sixth-Year Courses	<i>Fall</i>	CET 4332	Steel Design 2
		()	Social Science/Humanities Elective
		()	Social Science/Humanities Elective
	<i>Winter</i>	CET 4371	Concrete Design 1
		()	Social Science/Humanities Elective
		()	Technical Elective
	<i>Spring</i>	CET 4372	Concrete Design 2
		()	Technical Elective
Seventh-Year Courses	<i>Fall</i>	SPC ()	Communication Elective
		()	Social Science/Humanities Elective
		()	Technical Elective
	<i>Winter</i>	MET 4330	Mechanical Design A
		SPC ()	Communication Elective
		()	Lab Elective
	<i>Spring</i>	MET 4331	Mechanical Design B
		()	Open Elective
		()	Social Science/Humanities Elective
Suggested Technical Electives		CET 4301	Plane Surveying
		CET 4302	Geodetic Surveying
		CET 4303	Route Surveying
		CET 4311	Highway Engineering
		CET 4361	Materials and Soil Mechanics
		CET 4393	Construction Administration
		IIS 4393	Engineering Probability and Statistics
		MET 4340	Thermodynamics A
		MET 4414	Mechanical Vibrations
		MET 4415	Experimental Stress Analysis
		MET 4416	Stress Analysis C
		MET 4481	Materials B
		MET 4482	Applied Metallurgy

Computer Technology Programs

The computer technology professional's work relates to the design and use of computer system hardware and software. Areas of study include the design and architecture of the computer system; software issues include the methodology and application of problem solving and the utilization of hardware.

We offer both an associate's and a bachelor's degree program in computer technology.

The associate's degree program in computer technology offers you the opportunity to understand the mathematical and technological foundations of both hardware and software. In addition to providing a more thorough

study of hardware and software, the bachelor's degree program gives you the opportunity to specialize in a specific area through five required technical electives.

Career opportunities may include computer programming for engineering, science, and business. Additional employment opportunities concern designing, engineering, and testing of computers; and interfacing computers with various types of equipment used in automation. Associate's degree graduates may qualify for entry-level positions in the areas listed, while bachelor's degree graduates may secure employment with more responsibility.

Computer Technology (Major Code 036)

The Computer Technology Program leads to the associate in engineering degree. Degree candi-

dates must earn 100 credits by completing the following four-year curriculum.

First-Year Courses	<i>Fall</i>	CT	4105	Pascal/Algorithms
		MTH	4107	College Algebra
	<i>Winter</i>	CT	4150	Computer Organization
		MTH	4108	Pre-Calculus
	<i>Spring</i>	GET	4170	Engineering Graphics 1
		MTH	4120	Calculus 1
Second-Year Courses	<i>Fall</i>	MTH	4121	Calculus 2
		PHY	4117	Physics 1
	<i>Winter</i>	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4173	Physics Lab 1
	<i>Spring</i>	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4174	Physics Lab 2
Third-Year Courses	<i>Fall</i>	EET	4151	Circuit Analysis 1
		MTH	4122	Calculus 3
	<i>Winter</i>	CT	4310	FORTTRAN/File Processing
		EET	4152	Circuit Analysis 2
	<i>Spring</i>	EET	4311	Electronics 1
		ENG	4111	Critical Writing 2
Fourth-Year Courses	<i>Fall</i>	CT	4311	Programming with the C Language
		CT	4368	Semiconductor Logic
	<i>Winter</i>	CT	4345	Assembly Language
		CT	4369	Computer Logic
	<i>Spring</i>	CT	4330	Data Structures
		CT	4374	Introduction to CPU Hardware
		()		Social Science/Humanities Elective

Computer Technology (Major Code 037)

The Computer Technology Program leads to the bachelor of engineering technology degree. Degree candidates must earn at least 183 credits by completing the following seven-year curriculum.

First-Year Courses	Fall	CT	4105	Pascal/Algorithms
		MTH	4107	College Algebra
	Winter	CT	4150	Computer Organization
		MTH	4108	Pre-Calculus
	Spring	GET	4170	Engineering Graphics 1
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4173	Physics Lab 1
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4174	Physics Lab 2
Third-Year Courses	Fall	EET	4151	Circuit Analysis 1
		MTH	4122	Calculus 3
	Winter	CT	4310	FORTTRAN/File Processing
		EET	4152	Circuit Analysis 2
	Spring	CT	4335	Numerical Methods
		EET	4311	Electronics 1
Fourth-Year Courses	Fall	CT	4368	Semiconductor Logic
		ENG	4111	Critical Writing 2
		(	)	Social Science/Humanities Elective
	Winter	CT	4345	Assembly Language
		CT	4369	Computer Logic
	Spring	CT	4374	Introduction to CPU Hardware
		(	)	Social Science/Humanities Elective

Fifth-Year Courses

<i>Fall</i>	CT	4311	Programming with the C Language
	CT	4375	CPU Architecture
<i>Winter</i>	CT	4330	Data Structures
	(		) Social Science/Humanities Elective
	(		) Technical Elective
<i>Spring</i>	CT	4355	Micro Peripheral Hardware
	ECN	4115	Economic Principles and Problems 1
	(		) Social Science/Humanities Elective

Sixth-Year Courses

<i>Fall</i>	CT	4356	Complex Peripheral Hardware
	(		) Technical Elective
<i>Winter</i>	CT	4340	Software Engineering Design
	CT	4351	Advanced Computer Organization
<i>Spring</i>	CT	4380	Data Communication Methods
	(		) Social Science/Humanities Elective
	(		) Social Science/Humanities Elective

Seventh-Year Courses

<i>Fall</i>	CT	4360	Industry Software
	(		) Open Elective
	(		) Technical Elective
<i>Winter</i>	CT	4365	Industry Hardware
	(		) Technical Elective
<i>Spring</i>	(		) Social Science/Humanities Elective
	(		) Social Science/Humanities Elective
	(		) Technical Elective

Suggested Technical Electives

CT	4321	Programming with Ada
CT	4348	LISP
CT	4363	Concurrent Programming
CT	4377	VLSI Design
CT	4379	Computer Networks
CT	4381	Operating Systems
CT	4382	Computer Graphics Programming
CT	4383	Database
CT	4384	Large System Assembly Languages
CT	4385	Introduction to Simulation Programming
CT	4387	Bit Slice Microcomputers
CT	4389	Single-Chip Microprocessors
CT	4390	Special Problems in Computer Technology
CT	4393	UNIX Operating System
CT	4394	Object Oriented Programming
CT	4395	Computer Security
CT	4396	PROLOG: An Introduction to Artificial Intelligence

Electrical Engineering Technology Programs

Electrical engineering technologists consider the design and operation of equipment and systems related to communications, data processing, electrical control, and power. In the power utility field, for example, the electrical engineering technologist is responsible for the generation, transmission, and distribution of electricity for light and power.

We offer both an associate's and a bachelor's degree program in electrical engineering technology.

The associate's degree program in electrical engineering technology relates to the design, development, and operation of communications, data processing, and electronic control equipment. The equipment is applied to computers, military and space explorations, and automated industrial production equipment. The bachelor's

degree program, in addition, relates to the installation and production of a variety of electrical and electronic equipment. Fields in which such equipment is applied include communications, data processing, industry, and in generating and utilizing electricity.

Career opportunities for associate's degree graduates include entry-level positions related to communications and electrical equipment, equipment manufacturing, and data processing and control. Career opportunities for bachelor's degree graduates are in public and private research laboratories; engineering consulting firms specializing in industrial and plant applications; electric utilities; and organizations concerned with the operation, manufacture, installation, or sale of electrical or electronic systems and equipment.

Electrical Engineering Technology

(Major Code 033)

The Electrical Engineering Technology Program leads to the associate in engineering degree. The program is accredited by the Technology Accreditation Commission of the Accreditation

Board for Engineering and Technology. Degree candidates must earn at least 105 credits by completing the following four-year curriculum.

First-Year Courses	<i>Fall</i>	GET 4170	Engineering Graphics 1
		MTH 4107	College Algebra
	<i>Winter</i>	GET 4172	Electrical Engineering Graphics
		MTH 4108	Pre-Calculus
	<i>Spring</i>	GET 4100	Computer Programming for Engineering Technology
		MTH 4120	Calculus 1
Second-Year Courses	<i>Fall</i>	MTH 4121	Calculus 2
		PHY 4117	Physics 1
	<i>Winter</i>	ENG 4110	Critical Writing 1
		PHY 4118	Physics 2
		PHY 4173	Physics Lab 1
	<i>Spring</i>	GET 4306	Technical Communications
		PHY 4119	Physics 3
		PHY 4174	Physics Lab 2
Third-Year Courses	<i>Fall</i>	EET 4151	Circuit Analysis 1
		MTH 4122	Calculus 3
	<i>Winter</i>	EET 4124	Circuits Lab 1
		EET 4152	Circuit Analysis 2
		MTH 4123	Differential Equations*
	<i>Spring</i>	EET 4125	Circuits Lab 2
		ENG 4111	Critical Writing 2
		()	Social Science/Humanities Elective
Fourth-Year Courses	<i>Fall</i>	EET 4311	Electronics 1
		EET 4353	Circuit Analysis 3*
		()	Social Science/Humanities Elective
	<i>Winter</i>	EET 4312	Electronics 2
		EET 4354	Circuit Analysis 4*
	<i>Spring</i>	EET 4310	Electrical Measurements
		EET 4313	Electronics 3
		EET 4323	Electronics Lab

*Students not planning to enter a bachelor's degree program after graduation can substitute a social science/humanities elective for MTH 4123 Differential Equations; EET 4314 Pulse and Digital 1 for EET 4353 Circuit Analysis 3; and an approved technical elective for EET 4354 Circuit Analysis 4.

Electrical Engineering Technology

(Major Code 035)

The Electrical Engineering Technology Program leads to the bachelor of engineering technology degree. The program is accredited by the Technology Accreditation Commission of the

Accreditation Board for Engineering and Technology. Degree candidates must earn at least 186 credits by completing the following seven-year curriculum.

First-Year Courses	<i>Fall</i>	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	<i>Winter</i>	GET	4172	Electrical Engineering Graphics
		MTH	4108	Pre-Calculus
	<i>Spring</i>	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	<i>Fall</i>	MTH	4121	Calculus 2
		PHY	4117	Physics 1
	<i>Winter</i>	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4173	Physics Lab 1
	<i>Spring</i>	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4174	Physics Lab 2
Third-Year Courses	<i>Fall</i>	EET	4151	Circuit Analysis 1
		MTH	4122	Calculus 3
	<i>Winter</i>	EET	4124	Circuits Lab 1
		EET	4152	Circuit Analysis 2
		MTH	4123	Differential Equations
	<i>Spring</i>	EET	4125	Circuits Lab 2
		ENG	4111	Critical Writing 2
		()		Social Science/Humanities Elective
Fourth-Year Courses	<i>Fall</i>	EET	4311	Electronics 1
		EET	4353	Circuit Analysis 3
		()		Social Science/Humanities Elective
	<i>Winter</i>	EET	4312	Electronics 2
		EET	4354	Circuit Analysis 4
	<i>Spring</i>	EET	4310	Electrical Measurements
		EET	4313	Electronics 3
		EET	4323	Electronics Lab

Fifth-Year Courses

<i>Fall</i>	EET 4314	Pulse and Digital 1
	EET 4327	Advanced Electronics Lab 1*
	SPC ()	Communication Elective
<i>Winter</i>	EET 4328	Advanced Electronics Lab 2*
	EET ()	Technical Elective
	SPC ()	Communication Elective
<i>Spring</i>	EET 4329	Advanced Electronics Lab 3*
	EET 4330	Energy Conversion
	MET 4319	Mechanics

Sixth-Year Courses

<i>Fall</i>	EET 4370	Digital Computers 1
	()	Open Elective
	()	Social Science/Humanities Elective
<i>Winter</i>	EET 4371	Digital Computers 2
	()	Social Science/Humanities Elective
	()	Social Science/Humanities Elective
<i>Spring</i>	EET 4337	Distributed Systems
	EET ()	Technical Elective

Seventh-Year Courses

<i>Fall</i>	EET ()	Technical Elective
	()	Social Science/Humanities Elective
<i>Winter</i>	EET 4377	Control Engineering 1
	EET ()	Technical Elective
	()	Social Science/Humanities Elective
<i>Spring</i>	EET 4378	Control Engineering 2
	()	Social Science/Humanities Elective

Suggested Technical Electives

CT 4311	Programming with the C Language
CT 4374	Introduction to CPU Hardware
CT 4375	CPU Architecture
EET 4315	Pulse and Digital 2
EET 4317	Principles of Communication Systems 1
EET 4318	Principles of Communication Systems 2
EET 4319	Principles of Communication Systems 3
EET 4360	Photovoltaic Technology
EET 4362	Basic Power Systems 1
EET 4363	Basic Power Systems 2
EET 4364	Basic Power Systems 3
EET 4391	Basic Optics and Optical Systems Design
EET 4392	Optoelectronics and Fiber Optics
IIS 4360	Engineering Economy
IIS 4393	Engineering Probability and Statistics
MET 4340	Thermodynamics A
MET 4380	Materials A

*EET 4341, EET 4342, and EET 4343 Power and Control Labs 1 through 3 may be substituted for EET 4327, EET 4328, and EET 4329 Advanced Electronic Labs 1 through 3.

Energy Systems Program

Energy systems is an interdisciplinary concentration demanding skills and knowledge from several areas of engineering technology. The consumption of energy, and the need for its conservation, has increased in the last two decades. The importance and the expense of natural resources have created a demand for individuals who can help develop and maintain systems designed to generate or use energy efficiently.

We offer an associate's degree program in energy systems.

The associate's degree program in energy systems offers you the opportunity to plan for more

efficient use of energy, for both residential and commercial settings. Classroom instruction coupled with laboratory experience helps develop the mathematics-science-English core into a career-oriented energy systems curriculum. There are opportunities to design, install, troubleshoot, repair, and maintain heating, ventilation, and air-conditioning systems. Additional career opportunities relate to the design and operation of nuclear power plants.

Energy Systems (Major Code 061)

The Energy Systems Program leads to the associate in science degree. Degree candidates must earn 100 credits by completing the following four-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4100	Computer Programming for Engineering Technology
		MTH	4108	Pre-Calculus
	Spring	MET	4344	Energy Systems Theory and Hydraulics
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4173	Physics Lab 1
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4174	Physics Lab 2
	Third-Year Courses	Fall	EET	4320
MET			4340	Thermodynamics A
Winter		CET	4391	Architectural Design 1
		MET	4341	Thermodynamics B
Spring		MET	4342	Refrigeration and Air-Conditioning (AC)
		MET	4345	Heating, Ventilating, and AC 1
Fourth-Year Courses	Fall	MET	4346	Heating, Ventilating, and AC 2
		MET	4347	Distribution Systems for Mechanical Systems
		MET	4350	Heating, Ventilating, and AC Lab
	Winter	MET	4348	Energy Conservation
		()		Technical Elective
	Spring	CET	4393	Construction Administration
		MET	4349	Heating, Ventilating, and AC Systems Design
Suggested Technical Electives		Same as Mechanical Engineering Technology, Suggested Technical Electives (see page 27).		

Manufacturing Engineering Technology Program

Manufacturing systems require interactions between machines and people. Manufacturing engineering technology is concerned with the design and use of manufacturing systems in the industrial environment.

We offer a bachelor's degree program in manufacturing engineering technology.

The bachelor's degree program in manufacturing engineering technology offers you the opportunity to become familiar with the machines, materials, and processes used in manufacturing.

The program emphasizes the emerging use of computers without sacrificing attention to traditional areas of a manufacturing education. Areas addressed in the program include materials and processes, computer-aided manufacturing, numerical control, and robotics. The core courses, combined with hands-on laboratory experiences, allow students to develop the skills required to work in manufacturing. Career opportunities are within various manufacturing industries, such as aircraft or electronics manufacturing.

Manufacturing Engineering Technology

(Major Code 056)

The Manufacturing Engineering Technology Program leads to the bachelor of engineering technology degree. Degree candidates must

earn 187 credits by completing the following seven-year curriculum.

First-Year Courses

<i>Fall</i>	CHM	4111	General Chemistry 1
	MTH	4107	College Algebra
<i>Winter</i>	CT	4105	Pascal/Algorithms
	GET	4170	Engineering Graphics 1
	MTH	4108	Pre-Calculus
<i>Spring</i>	GET	4171	Engineering Graphics 2
	MTH	4120	Calculus 1

Second-Year Courses

<i>Fall</i>	MTH	4121	Calculus 2
	PHY	4117	Physics 1
<i>Winter</i>	ENG	4110	Critical Writing 1
	PHY	4118	Physics 2
	PHY	4173	Physics Lab 1
<i>Spring</i>	GET	4306	Technical Communications
	PHY	4119	Physics 3
	PHY	4174	Physics Lab 2

Third-Year Courses

<i>Fall</i>	MFG	4321	Computer-Aided Manufacturing 1
	MTH	4122	Calculus 3
<i>Winter</i>	IIS	4393	Engineering Probability and Statistics
	MFG	4322	Computer-Aided Manufacturing 2
<i>Spring</i>	ENG	4111	Critical Writing 2
	MFG	4311	Manufacturing Materials and Processes 1
	(	)	Social Science/Humanities Elective

Fourth-Year Courses

<i>Fall</i>	MFG	4312	Manufacturing Materials and Processes 2
	MFG	4331	Computer Methods in Manufacturing Design 1
	(	)	Social Science/Humanities Elective
<i>Winter</i>	EET	4320	Electricity and Electronics
	MFG	4332	Computer Methods in Manufacturing Design 2
<i>Spring</i>	ECN	4115	Economic Principles and Problems 1
	(	)	Social Science/Humanities Elective
	(	)	Social Science/Humanities Elective

Fifth-Year Courses

<i>Fall</i>	IM	4314	Productivity Enhancement and Quality
	MET	4301	Mechanics A
	(	)	Social Science/Humanities Elective
<i>Winter</i>	IM	4301	Introduction to Operations Management
	MET	4302	Mechanics B
	MFG	4341	Introduction to Computer-Aided Design
<i>Spring</i>	(	)	Social Science/Humanities Elective
	(	)	Technical Elective*

Sixth-Year Courses

<i>Fall</i>	MET	4340	Thermodynamics A
	MFG	4381	Plant Layout and Design
<i>Winter</i>	MS	4332	Statistical Quality Control
	(	)	Technical Elective*
<i>Spring</i>	MFG	4351	Assembly Automation
	(	)	Social Science/Humanities Elective
	(	)	Technical Elective*

Seventh-Year Courses

<i>Fall</i>	IIS	4360	Engineering Economy
	MFG	4361	Numerical Controlled Machines (Basic)
<i>Winter</i>	MFG	4371	Robotics
	(	)	Technical Elective*
<i>Spring</i>	HRM	4301	Organizational Behavior
	(	)	Social Science/Humanities Elective
	(	)	Technical Elective*

*Suggested technical electives are being developed for the manufacturing engineering technology curriculum.

Mechanical Engineering Technology Programs

Mechanical engineering technologists harness power resources that help machinery perform useful tasks. In contrast to civil engineering, which deals primarily with static forces and structures, mechanical engineering is concerned with the motion and kinetics of devices that are activated by hydraulic, electrical, mechanical, and thermodynamic forces.

We offer both an associate's and a bachelor's degree program in mechanical engineering technology. A bachelor's degree program in aerospace maintenance engineering technology is also offered.

The associate's degree offers you the opportunity to prepare to be an entry-level technician in designing, producing, and installing mechanical tools, machinery, engines, and transportation equipment. The bachelor's degree focuses on designing, developing, operating, and installing equipment that involves interactions of mechanical, hydraulic, and thermodynamic forces. The equipment may include machinery, engines, boilers, furnaces, air-conditioning systems, heating systems, and transportation.

Because of the mechanization of all industry, graduates of the associate's degree program in mechanical engineering technology may find entry-level career opportunities in almost any industry or engineering organization. Career opportunities for graduates of the bachelor's degree program are in industries that produce mechanized and automated equipment, in design and engineering organizations, and in companies that focus primarily on manufacturing and production.

The bachelor's degree program in aerospace engineering technology offers preparation for designing, developing, operating, installing, and producing aircraft and aircraft component systems. Career opportunities are available in technical, support, and management positions within the aircraft industry. Additional opportunities may be found within engineering teams that manufacture aircraft or spacecraft components, and among design/application positions in both the civilian and military aerospace markets.

Mechanical Engineering Technology

(Major Code 021)

The Mechanical Engineering Technology Program leads to the associate in engineering degree. The program is accredited by the Technology Accreditation Commission of

the Accreditation Board for Engineering and Technology. Degree candidates must earn 104 credits by completing the following four-year curriculum.

First-Year Courses

<i>Fall</i>	GET	4170	Engineering Graphics 1
	MTH	4107	College Algebra
<i>Winter</i>	GET	4171	Engineering Graphics 2
	MTH	4108	Pre-Calculus
<i>Spring</i>	GET	4100	Computer Programming for Engineering Technology
	MTH	4120	Calculus 1

Second-Year Courses

<i>Fall</i>	MTH	4121	Calculus 2
	PHY	4117	Physics 1
<i>Winter</i>	ENG	4110	Critical Writing 1
	PHY	4118	Physics 2
	PHY	4173	Physics Lab 1
<i>Spring</i>	GET	4306	Technical Communications
	PHY	4119	Physics 3
	PHY	4174	Physics Lab 2

Third-Year Courses

<i>Fall</i>	CHM	4111	General Chemistry 1
	MET	4301	Mechanics A
	MTH	4122	Calculus 3
<i>Winter</i>	GET	4364	Kinematics
	MET	4302	Mechanics B
<i>Spring</i>	MET	4314	Stress Analysis A
	MET	4380	Materials A

Fourth-Year Courses

<i>Fall</i>	ECN	4115	Economic Principles and Problems 1
	MET	4315	Stress Analysis B
	MET	4390	Measurement and Analysis Lab
<i>Winter</i>	ENG	4111	Critical Writing 2
	MET	4340	Thermodynamics A
	MET	4391	Technology Lab A
<i>Spring</i>	MET	4370	Fluid Mechanics A
	MET	4392	Technology Lab B
	(	)	Social Science/Humanities Elective

Mechanical Engineering Technology

(Major Code 023)

The Mechanical Engineering Technology Program leads to the bachelor of engineering technology degree. The program is accredited by the Technology Accreditation Commission

of the Accreditation Board for Engineering and Technology. Degree candidates must earn 186 credits by completing the following seven-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1	
		MTH	4107	College Algebra	
	Winter	GET	4171	Engineering Graphics 2	
		MTH	4108	Pre-Calculus	
	Spring	GET	4100	Computer Programming for Engineering Technology	
		MTH	4120	Calculus 1	
Second-Year Courses	Fall	MTH	4121	Calculus 2	
		PHY	4117	Physics 1	
	Winter	ENG	4110	Critical Writing 1	
		PHY	4118	Physics 2	
		PHY	4173	Physics Lab 1	
	Spring	GET	4306	Technical Communications	
		PHY	4119	Physics 3	
		PHY	4174	Physics Lab 2	
	Third-Year Courses	Fall	CHM	4111	General Chemistry 1
MET			4301	Mechanics A	
MTH			4122	Calculus 3	
Winter		GET	4364	Kinematics	
		MET	4302	Mechanics B	
Spring		MET	4314	Stress Analysis A	
		MET	4380	Materials A	
Fourth-Year Courses		Fall	ECN	4115	Economic Principles and Problems 1
			MET	4315	Stress Analysis B
	MET		4390	Measurement and Analysis Lab	
	Winter	ENG	4111	Critical Writing 2	
		MET	4340	Thermodynamics A	
		MET	4391	Technology Lab A	
	Spring	MET	4370	Fluid Mechanics A	
		MET	4392	Technology Lab B	
		()		Social Science/Humanities Elective	

Fifth-Year Courses

<i>Full</i>	IIS	4360	Engineering Economy
	MET	4303	Mechanics C
<i>Winter</i>	MET	4341	Thermodynamics B
	MET	4371	Fluid Mechanics B
<i>Spring</i>	MET	4342	Refrigeration and Air-Conditioning
	MET	4416	Stress Analysis C
	OR		
	MET	4481	Materials B

Sixth-Year Courses

<i>Full</i>	MET	4343	Heat Transfer
	MET	4393	Technology Lab C
	(	)	Social Science/Humanities Elective
<i>Winter</i>	MET	4330	Mechanical Design A
	MET	4394	Technology Lab D
	(	)	Social Science/Humanities Elective
<i>Spring</i>	MET	4331	Mechanical Design B
	MET	4395	Technology Lab E
	(	)	Social Science/Humanities Elective

Seventh-Year Courses

<i>Full</i>	SPC	(	)	Communication Elective
	(	)		Social Science/Humanities Elective
	(	)		Technical Elective
<i>Winter</i>	EET	4320	Electricity and Electronics	
	SPC	(	)	Communication Elective
	(	)		Technical Elective
<i>Spring</i>	(	)		Open Elective
	(	)		Social Science/Humanities Elective
	(	)		Technical Elective

Suggested Technical Electives

CET	4301	Plane Surveying
CET	4331	Steel Design 1
CET	4371	Concrete Design 1
EET	4321	Electricity and Electronics 2
MET	4414	Mechanical Vibrations
MET	4415	Experimental Stress Analysis
MET	4416	Stress Analysis C
MET	4444	Power Generation
MET	4481	Materials B
MET	4482	Applied Metallurgy

Aerospace Maintenance Engineering
Technology (Major Code 098)

The Aerospace Maintenance Engineering Technology Program leads to the bachelor of engineering technology degree. Before entering the program, degree candidates must complete the East Coast Aero Technical School airframe and power plant technical curriculum or its equivalent. In addition, degree candidates must

complete four prerequisite courses. The prerequisite courses are MTH 4107 College Algebra; MTH 4108 Pre-Calculus; MTH 4120 Calculus 1; and CHM 4111 General Chemistry 1. Degree candidates must earn at least 186 credits by completing the following five-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4121	Calculus 2
	Winter	GET	4171	Engineering Graphics 2
		MTH	4122	Calculus 3
	Spring	GET	4100	Computer Programming for Engineering Technology
		(		) Social Science/Humanities Elective
Second-Year Courses	Fall	ENG	4110	Critical Writing 1
		PHY	4117	Physics 1
	Winter	ENG	4111	Critical Writing 2
		PHY	4118	Physics 2
		PHY	4173	Physics Lab 1
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4174	Physics Lab 2
Third-Year Courses	Fall	ECN	4115	Economic Principles and Problems 1
		MET	4301	Mechanics A
	Winter	MET	4302	Mechanics B
		MET	4340	Thermodynamics A
	Spring	MET	4314	Stress Analysis A
		MET	4380	Materials A

For the last two years, choose either curriculum A or B.

CURRICULUM A

Fourth-Year Courses	<i>Fall</i>	MET 4315	Stress Analysis B
		MET 4390	Measurement and Analysis Lab
		()	Social Science/Humanities Elective
	<i>Winter</i>	EET 4320	Electricity and Electronics
		MET 4391	Technology Lab A
		()	Social Science/Humanities Elective
	<i>Spring</i>	MET 4370	Fluid Mechanics A
		()	Social Science/Humanities Elective

Fifth-Year Courses	<i>Fall</i>	MET ()	Technical Elective
		()	Social Science/Humanities Elective
	<i>Winter</i>	MET ()	Technical Elective
		()	Open Elective
		()	Social Science/Humanities Elective
	<i>Spring</i>	MET 4481	Materials B
		()	Social Science/Humanities Elective
		()	Social Science/Humanities Elective

CURRICULUM B

Fourth-Year Courses	<i>Fall</i>	MET 4390	Measurement and Analysis Lab
		()	Social Science/Humanities Elective
		()	Social Science/Humanities Elective
	<i>Winter</i>	EET 4320	Electricity and Electronics
		MET 4341	Thermodynamics B
	<i>Spring</i>	MET 4370	Fluid Mechanics A
		()	Social Science/Humanities Elective

Fifth-Year Courses	<i>Fall</i>	MET 4393	Technology Lab C
		MET ()	Technical Elective
		()	Social Science/Humanities Elective
	<i>Winter</i>	MET ()	Technical Elective
		()	Open Elective
		()	Social Science/Humanities Elective
	<i>Spring</i>	MET 4481	Materials B
		()	Social Science/Humanities Elective
		()	Social Science/Humanities Elective

Suggested Technical Electives Same as Mechanical Engineering Technology, Suggested Technical Electives (see page 27).

Telecommunications Program

Telecommunications is an interdisciplinary concentration demanding skills and information from several areas of engineering technology. Modern society has experienced an unprecedented growth in information processing and communications, so that individuals who can help design and maintain information and communication systems are in high demand.

We offer an associate's degree program in telecommunications.

The associate's degree program in telecommunications offers you the opportunity

to study the electronic transfer of information through voice, data, or video media. Specific methods of electronic transfer, such as electronic signals in wires, light waves in optic fibers, and radio waves in the earth's atmosphere are discussed. There are career opportunities in the telephone, data processing, radio transmission/reception, cable television, service, and computer industries.

Telecommunications (Major Code 038)

The Telecommunications Program leads to the associate in science degree. Degree candidates must earn 101 credits by completing the following four-year curriculum.

First-Year Courses	<i>Fall</i>	EET 4180	Introduction to Telecommunications
		MTH 4107	College Algebra
	<i>Winter</i>	GET 4138	Introduction to Programming for Telecommunications
		MTH 4108	Pre-Calculus
	<i>Spring</i>	GET 4170	Engineering Graphics 1
		MTH 4120	Calculus 1
Second-Year Courses	<i>Fall</i>	MTH 4121	Calculus 2
		PHY 4117	Physics 1
	<i>Winter</i>	ENG 4110	Critical Writing 1
		PHY 4118	Physics 2
		PHY 4173	Physics Lab 1
	<i>Spring</i>	GET 4306	Technical Communications
		PHY 4119	Physics 3
		PHY 4174	Physics Lab 2
Third-Year Courses	<i>Fall</i>	EET 4151	Circuit Analysis 1
		EET 4384	Video Communications
	<i>Winter</i>	ECN 4115	Economic Principles and Problems 1
		EET 4124	Circuits Lab 1
		EET 4152	Circuit Analysis 2
	<i>Spring</i>	EET 4125	Circuits Lab 2
		EET 4310	Electrical Measurements
		ENG 4111	Critical Writing 2
Fourth-Year Courses	<i>Fall</i>	EET 4311	Electronics 1
		EET 4381	Telecommunications Systems 1
	<i>Winter</i>	EET 4312	Electronics 2
		EET 4382	Telecommunications Systems 2
	<i>Spring</i>	EET 4323	Electronics Lab
		EET 4383	Telecommunications Systems 3
		MGT 4101	Introduction to Business and Management 1

Course Descriptions

Overview

This section contains the following information about each course offered by the School of Engineering Technology.

- **Course number.** Each alpha/numeric course number provides specific information. For example, consider the course number CET 4301.

CET 4301 The alpha code indicates which department is offering the course. In this case, the department is civil engineering technology.

CET 4301 The first number in the numeric code indicates whether the course meets during the day or in the evening. All 4000 series courses are offered in the evening; all 1000 series courses are offered during the day.

CET 4301 The last three numbers in the code indicate the course level: 001–099 are compensatory courses; 100–299 are introductory- to intermediate-level courses; and 300–699 are advanced-level courses.

- **Course title.**
- **Number of quarter hours (QH).** One quarter hour represents approximately three hours of student learning time (fifty minutes of lecture plus two hours of independent study) per week. If appropriate, class hours (CH) and lab hours (lab) are listed as well.
- **Quarters in which the course is offered.** Not all courses are offered every quarter. If the code TBA is printed next to a course title, call the program coordinator at 617-437-2500 for scheduling information.
- **Topics discussed in the course.**
- **Prerequisites.** Complete prerequisites before enrolling, unless otherwise specified.

Use the curriculum listed for your program to determine which courses you need to complete in the next academic year ("Degree Program

Descriptions," see page 5). Use the course descriptions to read about each specific course and to learn the quarters in which the course is offered. Because most courses are not offered every quarter, plan your course load for the entire academic year, not just the next quarter.

Before registration, get the *University College and School of Engineering Technology Schedule* for the next quarter by calling 617-437-2500. The *Schedule* provides you with the meeting times and locations for the courses being offered during the next quarter.

Academic counseling is available to help plan your course load for the coming academic year. If you need help, contact a School of Engineering Technology program counselor at 617-437-2500.

Policy on Changes of Program

The School of Engineering Technology reserves the right to cancel, modify, or add to the courses in any curriculum. The University further reserves the right to change the requirements for graduation. Any changes that may be made from time to time relative to this policy shall be applicable to all students in the school, college, or department concerned, including former students who may re-enroll.

Guidelines for Choosing Electives

Many of the degree program curricula require students to complete electives. The electives give students the opportunity either to explore topics beyond the curriculum's scope or to gain extensive knowledge about topics introduced by the core courses.

Open Electives

Any course is acceptable as an open elective except physical education, military science, and preparatory courses. An open elective may be either a three or a four quarter-hour course.

Social Science/Humanities Electives

Social science/humanities electives are offered through University College and must be chosen

from a list that is available from the School of Engineering Technology. Six quarter-hours of social science/humanities electives must be in the speech communications (SPC) category.

Technical Electives

Technical electives must be chosen from the list of suggested technical electives appearing at the end of the respective degree curriculum. Students wishing to take an upper-level course that does not appear on the list must petition for permission before attending the class. Students should submit a proposed program of elective courses—preferably representing a minor field of concentration consistent with personal career objectives—for approval by the program coordinator.

Civil Engineering Technology

CET 4301 Plane Surveying

(4 QH) Fall

Examines surveying principles; theory of measurements; leveling; traverse computations; area calculation; and stadia principles and topography.

Prereq. MTH 4108.

CET 4302 Geodetic Surveying

(4 QH) Winter

Introduces practical astronomy for surveying, including basic spherical trigonometry. Covers geodetic surveying, including precise leveling, triangulation, EDM equipment, and baseline measurements. *Prereq.* CET 4301.

CET 4303 Route Surveying

(4 QH) Spring

Studies simple and compound curves; vertical curves; earthwork computations; solution of the mass diagram; and an introduction to route location by photogrammetry. *Prereq.* CET 4301.

CET 4307 Legal Aspects of Surveying

(4 QH) Winter

Covers registry of deeds and probate; ownership of land; deeds; descriptions of qualifying expression; adverse possession; Massachusetts land court; and expert witness. *Prereq.* CET 4301.

CET 4311 Highway Engineering

(4 QH) Spring 1991

Explores engineering considerations in the planning and construction of modern highways and highway routing; traffic flow and traffic control; and computer applications to transportation problems. *Prereq.* CET 4301.

CET 4316 Land Use Planning

(4 QH) Fall 1991

Studies environmental, sociological, economic aspects, and traditional basis for land use planning. Covers objectives, content, form, and preparation of plan; community and public facilities; transportation; and environmental impact and plan implementation.

Prereq. GET 4171.

CET 4321 Introduction to Structural Design

(2 CH, 4 lab, 4 QH) Spring

Presents tabular methods for the design of members and connections using the AISC Code. *Prereq.* GET 4171 and MET 4314.

CET 4324 Structural Analysis 1

(4 QH) Fall

Surveys the reactions, shears, bending moments, and forces developed by loading systems on beams and trusses; influence lines for beams, girders, and trusses; and solutions for forces from moving load systems on statically determinate structures. *Prereq.* MET 4315.

CET 4325 Structural Analysis 2

(4 QH) Winter 1991

Covers classical methods of deflection solution for beams and trusses. Discusses methods of solving statically indeterminate structures.

Prereq. CET 4324.

CET 4331 Steel Design 1

(4 QH) Spring 1991

Examines design of steel members in structural frames; tension, compression, bending and eccentrically loaded members; and design of plate girders for buildings. *Prereq.* CET 4321 and MET 4315.

CET 4332 Steel Design 2

(4 QH) Fall 1991

Presents design of steel for highway bridges, composite design in bridges and buildings, introduction to plastic analysis, and design in steel.

Prereq. CET 4331.

CET 4341 Fluid Mechanics

(4 QH) Spring

This course has been replaced by MET 4370 Fluid Mechanics A.

CET 4350 Environmental 1

(4 QH) Winter 1991

Examines principles of water supply engineering; population forecasting; and quality and quantity of water for various uses. Other topics include water treatment processes; collection and disposal of wastewater and storm water; modern treatment methods; and wastewater plant operation. *Prereq.* CET 4341 and CHM 4111.

CET 4351 Environmental 2
(2 CH, 4 lab, 4 QH) Spring 1991

Studies the layout and design of water treatment and sewage treatment plants; and instrumentation and electrical equipment. Includes laboratory demonstrations. *Prereq.* CET 4350.

CET 4354 Advanced Industrial Wastewater Treatment (4 QH) TBA

Discusses environmental analysis, microbiology, biological treatment principles, and applications of physical-chemical treatment. Other topics include unit processes and operations, process trouble-shooting regulatory requirements, source reduction, and hazardous waste. *Prereq.* CET 4355 or CET 4356 or permission of instructor.

CET 4355 Biological Industrial Waste Treatment Operation (4 QH) TBA

Explores the operating principles and procedures of biological waste treatment as applied to industrial wastewaters. Emphasizes process calculations, controls, performance evaluation, monitoring, and microbiology along with operational problem definition and solution. *Prereq.* CET 4350 or equiv.

CET 4356 Physical-Chemical Industrial Waste Treatment Operations (4 QH) TBA

Introduces operational principles and procedures of the physical-chemical waste treatment process. Reviews chemistry related to precipitation, neutralization, oxidation reduction, and carbon absorption as well as the operation of ion exchange, reverse osmosis, and other membrane. Studies clarification and other solids separation methods along with sludge treatment options. *Prereq.* CET 4350 or equiv.

CET 4361 Materials and Soil Mechanics
(4 QH) Fall 1990, 1992

Examines the physical properties of portland cement, aggregates, mixing water and admixtures; batch proportioning; bituminous materials; index properties of soils, soil moisture and structure; compressibility; and theory of consolidation. *Prereq.* MET 4315.

CET 4371 Concrete Design 1
(4 QH) Winter

Examines the design of bending members, axially and eccentrically loaded columns by elastic and ultimate strength principles. *Prereq.* MET 4315.

CET 4372 Concrete Design 2
(4 QH) Spring 1990, 1992

Covers the reinforced concrete design of basic structures, including considerations of continuity. Includes an introduction to prestressed concrete member design. *Prereq.* CET 4371.

CET 4390 Technology of Modern Architecture
(4 QH) Fall 1990, 1992

Surveys architectural styles, both historical and contemporary, that emphasize engineering design and construction procedures required for the various types of buildings. *Prereq.* None.

CET 4391 Architectural Design 1
(4 QH) Winter 1991

Introduces basic architectural design concepts: proportion, scale, form, massing, color, texture, and lighting. Also examines orientation of structures, site organization, and selection of building materials. *Prereq.* CET 4390, GET 4171.

CET 4392 Architectural Design 2
(4 QH) Spring 1991

In this consideration of the building process, individual architectural design projects are assigned by the instructor. *Prereq.* CET 4391.

CET 4393 Construction Administration
(4 QH) Spring 1990, 1992

Discusses contracts, specifications, and bidding procedures; estimating and scheduling, including critical path; and discussion of personnel administration and union negotiation. Includes bid preparation for a small project. *Prereq.* None.

Chemistry

CHM 4101 Modern Chemistry 1*
(2 CH, 2.4 lab, 3 QH) Fall

This course has been replaced by CHM 4111 General Chemistry.

CHM 4111 General Chemistry 1*
(2 CH, 2.4 lab, 3 QH) Fall

Presents fundamental chemistry concepts such as symbols, formulas, equations, atomic weights, and calculations based on equations. Includes gases, liquids, solutions, and ionization. *The required lab is CHM 4117. Lab fee. Prereq.* MTH 4107 or equiv.

Computer Technology

CT 4105 Pascal/Algorithms
(4 QH) All Quarters

Studies using Pascal to develop problem-solving capabilities using computers. Covers problem solving, flowcharting, structured programming, loops, counters, and modularity. Includes Pascal language

*This is a University College course offered at a different tuition rate.

concepts such as data types, control statements, structures, arrays, procedures, functions, and input/output. *Prereq.* None.

CT 4150 Computer Organization

(4 QH) Winter

Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocessor programming, and input/output processing.

Prereq. CT 4105.

CT 4310 FORTRAN/File Processing

(4 QH) Winter

Teaches FORTRAN 77 as a second language, emphasizing structured programming and modularity. Topics include lists, matrices, subroutines, functions, global values, variable formatting, random number generators, sorting, searching, character-data manipulation, file handling, and documentation. Project required. *Prereq.* CT 4105.

CT 4311 Programming with the C Language

(4 QH) All Quarters

Assumes knowledge of a higher-level language. Teaches the C language, a general-purpose language suitable for programming operating systems, text-processing, and databases. Covers data types, arithmetic expressions, program looping, decision making, arrays, functions, procedures, character strings, global and local variables, scope rules, pointers, address arithmetic, structures, unions, and the C input/output library. Project required. *Prereq.* CT 4310.

CT 4321 Programming with Ada

(4 QH) TBA

Teaches Ada, a programming language for numerical applications, system programming applications, and applications with real-time and concurrent execution requirements. Includes readability, strong typing, exception handling, data abstracting, tasking, and generic units. Involves using the University's computer facilities to write programs dealing with numerical and system programming applications. *Prereq.* CT 4105, CT 4311, GET 4100 or knowledge of Pascal, C, or FORTRAN.

CT 4330 Data Structures

(4 QH) Winter, Spring

Introduces methods of representing and manipulating data in computer memory. Covers stacks, queues, lists, trees, heaps, sets, graphs, hashing, searching, and sorting. Project required.

Prereq. CT 4311.

CT 4335 Numerical Methods

(4 QH) Spring

Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer

facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq.* CT 4105.

CT 4340 Software Engineering Design

(4 QH) Winter

Offers structured methods for developing complex computer software. Explores developing structured specifications, structured designs, and the computer programs for complex problems using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability.

Prereq. CT 4311.

CT 4345 Assembly Language

(4 QH) Winter

Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq.* CT 4105 and CT 4150.

CT 4348 LISP

(4 QH) TBA

Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses various levels of implementation in LISP, a language well-suited to implement the standard techniques of data structure manipulation. Also explores techniques for recursion, complex data structures, storage management, and symbol table manipulation.

Prereq. CT 4330.

CT 4351 Advanced Computer Organization

(4 QH) Winter

Examines the functional characteristics of complex and special purpose computer systems, and the functions of general purpose multi-user and multi-processing operating systems. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis.

Prereq. CT 4356 and CT 4375.

CT 4355 Micro Peripheral Hardware

(4 QH) Spring

Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial

input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq.* CT 4374.

CT 4356 Complex Peripheral Hardware
(4 QH) Fall

Studies the interfacing and implementation of complex peripheral systems. Topics include disc and tape interfaces; graphic display devices; communication interfaces and subsystems; and input/output processors. *Prereq.* CT 4355.

CT 4360 Industry Software
(4 QH) Fall

Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of: database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq.* CT 4310.

CT 4363 Concurrent Programming
(4 QH) TBA

Examines the basic principles of concurrent programming. Students will write and run programs to demonstrate various aspects of concurrent programming techniques and issues. Topics include correctness of concurrent programs, material exclusion, timing Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq.* *Experience in either Pascal or C.*

CT 4365 Industry Hardware
(4 QH) Winter

Discusses the latest industrial developments and trends in computer hardware, conducted as a seminar. *Prereq.* CT 4356.

CT 4368 Semiconductor Logic
(4 QH) Fall

Analyzes the bipolar and MOS transistors in saturated and cutoff conditions. Examines implementing these concepts to form basic logic circuits and standard logic families, and convert logical expressions into hardware configuration representations. Topics include Ebers-Moll modeling, PMOS, NMOS, CMOS, bipolar characteristics, and standard logic families. *Prereq.* EET 4311.

CT 4369 Computer Logic
(4 QH) Winter

Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders, ALUs, memory arrays, and synchronous and asynchronous state machines. *Prereq.* CT 4368.

CT 4374 Introduction to CPU Hardware
(4 QH) Spring

Introduces the circuits and operation of microcomputers, focusing on microprocessor components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bus concepts, interrupts, coprocessors, input/output, and instruction timing.

Prereq. CT 4345 and CT 4368.

CT 4375 CPU Architecture
(4 QH) Fall

Presents high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining. *Prereq.* CT 4374.

CT 4377 VLSI Design
(4 QH) TBA

Introduces Very Large Scale Integration (VLSI) Integrated Circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer fabrication techniques; standards; testing; and costs. *Prereq.* CT 4369.

CT 4379 Computer Networks
(4 QH) TBA

Investigates the functional and operational aspects of computer networks. Topics include the ISO Reference Model's seven layers, ARPANET, DECNET, and SNA. *Prereq.* CT 4380.

CT 4380 Data Communication Methods
(4 QH) Spring

Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq.* CT 4375.

CT 4381 Operating Systems
(4 QH) TBA

Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq.* CT 4330 and CT 4345.

**CT 4382 Computer Graphics Programming
(4 QH) TBA**

Explores the computer plotting of two- and three-dimensional (2D and 3D) shapes. Involves writing and running programs using the University's computer and digital plotter. Topics include 2D transforms, 3D to 2D transforms, 3D transforms, surface representation, shading, hidden line, raster technology-color, introduction to interactive graphics, characters, curve fitting, and graphic data structures. *Prereq.* GET 4100.

**CT 4383 Databases
(4 QH) TBA**

Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities. Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq.* CT 4330.

**CT 4384 Large System Assembly Languages
(4 QH) TBA**

Explores Macro, a VAX-11 assembly language, to show how basic components in the CPU are used during program execution. Topics include integer, real, and character instruction sets, various addressing techniques, procedure linkage, and system input/output. *Prereq.* CT 4345.

**CT 4385 Introduction to Simulation Programming
(4 QH) TBA**

Introduces computer methods for solving simulated phenomena. Requires students to write and run programs implementing simulations. Topics include simple queues; multi-server queues; priorities including first in first out, last in last out; time aging of data; simple frequency distributions; and use of SIMULA, GPSS, and Standard Subroutine Library Routines. *Prereq.* CT 4335.

**CT 4387 Bit Slice Microcomputers
(4 QH) TBA**

The epitome of hardware flexibility is represented by the bit slice CPU. Students examine the basic design ground rules common to this style of hardware design. *Prereq.* CT 4355.

**CT 4389 Single-Chip Microprocessors
(4 QH) TBA**

When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8048, Z8, and others comes into play. An understanding of the hardware limitations of a single-chip system is the basis for this subject material. *Prereq.* CT 4374.

**CT 4390 Special Problems in Computer Technology
(4 QH) TBA**

Students perform theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

**CT 4393 UNIX Operating System
(4 QH) TBA**

Surveys advanced topics in the UNIX operating system and its filing system, including differences between the AT&T and Berkeley versions of UNIX. Also covers pipes, forks, execl, filter, signals, concurrency, processes, semaphores, EMACS, C preprocessor, macros, sed, grep, awd, make, gdb, dbx, lint, cb, lex, yacc, TeX, and shell programming. *Prereq.* CT 4330.

**CT 4394 Object-Oriented Programming
(4 QH) TBA**

Examines the methodologies currently used in object-oriented programming languages, drawing on case studies of Small Talk, Flavors, CLOS, and C⁺⁺. Other topics include G-Base, an object-oriented database system, and the concepts of abstraction, polymorphism, class inheritance, locks, and generic dispatch. *Prereq.* CT 4330.

**CT 4395 Computer Security
(4 QH) TBA**

Covers issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Other topics include software verification and validation, designing security into the hardware, and products currently available for securing systems and data. These subjects will be addressed in terms of privacy as well as reliability. *Prereq.* CT 4380.

CT 4396 PROLOG: An Introduction to Artificial Intelligence (4 QH) TBA

Introduces fundamental artificial intelligence (AI) terms and techniques, using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Projects required. *Prereq.* CT 4330.

Economics

ECN 4115 Economic Principles and Problems 1* (3 QH) All Quarters

Applies the basic principles of economics to current public problems. Focusing on macroeconomics, explores the issues of unemployment, inflation, national income and employment theory, and government expenditures and taxation. *Prereq.* None.

ECN 4116 Economic Principles and Problems 2* (3 QH) All Quarters

Continues ECN 4115, focusing on the role of the banking system, the Federal Reserve System, and supply-side policies. Topics in microeconomics include the role of a market pricing system, supply and demand, the costs of production, profits, and the supply decision. *Prereq.* ECN 4115 or equiv.

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Electrical Engineering Technology

EET 4124 Circuits Laboratory 1**(3 lab, 2 QH) Fall, Winter**

Involves experiments in DC electrical circuits and the study of various measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's Law, Thevenin and Norton Theorems, as well as superposition and maximum power transfer theorems. *Prereq. EET 4151.*

EET 4125 Circuits Laboratory 2**(3 lab, 2 QH) Winter, Spring**

Offers further experimentation in electrical circuits and measurement techniques. Involves the operation of oscilloscopes, audio frequency and function generators. Explores inductance, capacitance, and the effect of frequency upon them. Studies measurements of amplitude, frequency, and phase shift using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits. *Prereq. EET 4124.*

EET 4151 Circuit Analysis 1**(4 QH) All Quarters**

Introduces Ohm's law, Kirchoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as the capacitor and inductor. *Prereq. MTH 4120 or PHY 4119.*

EET 4152 Circuit Analysis 2**(4 QH) All Quarters**

Studies the time domain (transient) analysis of R, L, and C elements; the energy storage in L and C circuits; and the responses in source-free RL and RC circuits. Includes the application of the unit step function and the response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra. Also covers three-phase circuits and three-wire single-phase systems. *Prereq. EET 4151.*

EET 4180 Introduction to Telecommunications**(4 QH) Fall**

Introduces students to voice, video, and data communications. Surveys the development of telephony and the operation of the telephone network. Emphasizes current developments in communica-

tions, particularly the use of digital transmission and switching. Introduces terminology peculiar to telephony. (Not open to electrical engineering technology majors.) *Prereq. None.*

EET 4310 Electrical Measurements**(4 QH) Fall, Spring**

Examines standards of measurements, dimensional analysis, errors and measurements of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Other areas include guaranteed error, methods of resistance measurements, digital voltmeters and analog to digital conversion, voltage references, potentiometers, and AC bridges. *Prereq. EET 4152.*

EET 4311 Electronics 1**(4 QH) All Quarters**

Introduces students to solid state electronic devices, such as diodes and transistors, emphasizing specifications, circuit characteristics, and techniques for analyzing circuit behavior. Investigates applications of diodes in rectification, power supply regulation, clipping, clamping, and voltage doubling situations. Involves analysis and design of transistor circuit topologies and bias networks. *Prereq. EET 4152.*

EET 4312 Electronics 2**(4 QH) All Quarters**

Investigates transistor bias stabilization of discrete and integrated circuits. Examines signal models of diodes and BJT, JFET, and MOSFET transistors. Analyzes single transistor amplifier configurations and multistage amplifiers. Investigates frequency response, amplitude, and phase characteristics of transistor circuits utilizing techniques such as the Bode plots. Presents design methods of coupling signals from one stage of an amplifier to another. *Prereq. EET 4311.*

EET 4313 Electronics 3**(4 QH) Fall, Winter, Spring**

Focuses on feedback and its application to operational amplifier circuits for signal processing and generation. Topics include stabilization of gain and bias, bandwidth improvement, distortion reduction, and impedance variation. Involves analysis and design of inverting and noninverting configurations of operational amplifier circuits, including rectifiers, oscillators, and filters. *Prereq. EET 4312.*

EET 4314 Pulse and Digital 1**(4 QH) Fall**

Studies the switching characteristics of semiconductor devices; logic gates and the logic families ECL, MOS, and Schottky TTL; speed limitations; and concepts of wave-shaping and wave-generating circuits including comparators, Schmitt trigger, and relaxation oscillators. *Prereq. EET 4311.*

EET 4315 Pulse and Digital 2**(4 QH) Winter**

Explores digital operations; logic statements and theorems; minimization of logic functions; flip-flops, counters, registers, and static and dynamic memory; sequential circuit design; sample and hold circuits; and analog-to-digital and digital-to-analog conversion. *Prereq. EET 4314.*

EET 4317 Principles of Communication Systems 1**(4 QH) Fall 1991**

Introduces signal analysis using Fourier methods; noise in communication systems; frequency selective amplifiers, including wideband; transistor power amplifiers AF and RF; oscillators; signal sources; and applications. *Prereq. EET 4313.*

EET 4318 Principles of Communication Systems 2**(4 QH) Winter 1992**

Explores the basic theory of amplitude, frequency, phase, and pulse code modulated systems; analysis of modulating and demodulating circuits; carrier systems using SSB; system block and level diagrams; logic control circuits in communication systems; and modems. *Prereq. EET 4317.*

EET 4319 Principles of Communication Systems 3**(4 QH) Spring 1992**

Presents the fundamentals of digital communications; sampling requirements; analog-to-digital conversion methods; system capacity and bandwidth; comparison of practical digital systems PAM, PCM, PFM, PWM; time and frequency division multiplexing; data decoding; and selected examples from telemetry and computer links. *Prereq. EET 4318.*

EET 4320 Electricity and Electronics**(4 QH) Fall, Winter**

Introduces students to circuit analysis, resistive networks, periodic excitation functions, steady state AC circuits; study of the physical foundations of electronics and the physical operation of electronic devices. (Not open to electrical engineering technology majors.) *Prereq. MTH 4120 and PHY 4119.*

EET 4321 Electricity and Electronics 2**(4 QH) TBA**

Discusses single-stage electronic circuits, magnetic circuits and transformers, electromechanical energy conversion, DC machines, and AC machines. (Not open to electrical engineering technology majors.) *Prereq. EET 4320.*

EET 4323 Electronics Laboratory**(3 lab, 2 QH) Spring**

Offers experimentation with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage

regulation, and integrated circuit regulators. Discusses bipolar and field effect transistors, amplifiers and voltage follower configurations, special semiconductors and operational amplifiers.

*Prereq. EET 4311.***EET 4327 Advanced Electronics Laboratory 1****(3 lab, 2 QH) Fall**

Includes experiments using oscilloscopes and examines transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers, transients and wave-shaping circuits, audio frequency oscillators, and operational amplifiers.

*Prereq. EET 4323.***EET 4328 Advanced Electronics Laboratory 2****(3 lab, 2 QH) Winter**

Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers, and counters. Considers active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq. EET 4327.*

EET 4329 Advanced Electronics Laboratory 3**(3 lab, 2 QH) Spring**

Involves spectral studies of FM and PM waves; amplitude limiters; the balanced modulators and single sideband generators; integrated circuit timers and monolithic random access memory; and monolithic phase-locked loop. Offers microwave experiments and a series of digital experiments.

*Prereq. EET 4328.***EET 4330 Energy Conversion****(4 QH) Spring**

Explores the generalized theory of rotating energy conversion devices; steady-state operation of the multiply-excited direct-current machine; control of speed; special machines; transformers; steady-state considerations of induction and synchronous machines; generalized machine and circuit model; and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq. EET 4353.*

EET 4337 Distributed Systems**(4 QH) Spring**

Examines radiation, transmission, and reception of electromagnetic waves; distributed-line constants and traveling waves of transmission lines; and differential equations of the uniform line.

*Prereq. MTH 4122 and PHY 4119.***EET 4341 Power and Controls Laboratory 1****(3 lab, 2 QH) Fall 1990, 1992**

Introduces standard laboratory measurement equipment, including voltmeters, ammeters, oscilloscopes, and frequency counters, as well as data-taking methods and report writing.

Investigates diodes, bipolar transistors, field effect devices, silicon control rectifiers, unijunction transistors, power supplies, regulators, and various types of feedback transistor amplifiers. *Prereq.* EET 4330.

EET 4342 Power and Controls Laboratory 2
(3 lab, 2 QH) Winter 1991

Offers experiments with characteristics of DC motors and generators, single- and multi-phase transformers, induction motors, synchronous motors, and three-phase power measurements. *Prereq.* EET 4341.

EET 4343 Power and Controls Laboratory 3
(3 lab, 2 QH) Spring 1991

Offers experiments with self-synchronous devices such as control transformers, transmitters and receivers, AC and DC servomotors, and open and closed loop response of servomechanisms and stepping motors. *Prereq.* EET 4342.

EET 4353 Circuit Analysis 3
(4 QH) Fall, Winter, Spring

Examines the application of differential equations to the solutions of linear, time-invariant electrical networks. Introduces singularity functions, convolution, and time domain transient analysis; network topology and duality; and the methods of transformation calculus and complex frequency concepts. *Prereq.* EET 4152.

EET 4354 Circuit Analysis 4
(4 QH) Fall, Winter, Spring

Covers signal analysis in the frequency domain; Fourier series; and Fourier and Laplace transform methods. Requires solving circuit problems using Laplace transforms and related theorems. *Prereq.* EET 4353.

EET 4360 Photovoltaic Technology
(4 QH) TBA

Examines the theory, operation, installation, and monitoring of a photovoltaic power system. Topics include the physics of silicon photovoltaic cells: amorphous, polycrystalline, and single crystal. Lab included. *Prereq.* EET 4311 and PHY 4119.

EET 4362 Basic Power Systems 1
(4 QH) Fall 1990, 1992

Considers power transmission lines; line constants; current voltage and power relations; introduction to electric-power distribution loads, feeders, and substations; and application of matrices. *Prereq.* EET 4354.

EET 4363 Basic Power Systems 2
(4 QH) Winter 1991

Studies symmetrical and unsymmetrical faults; protective devices—application and coordination; power flow in electric circuits; steady-state power limitations of systems; and voltage regulation theory and application. *Prereq.* EET 4362.

EET 4364 Basic Power Systems 3
(4 QH) Spring 1991

Examines computer applications to power systems with emphasis on load-flow studies; and basic ideas of systems planning, short-circuit studies, and system stability. *Prereq.* EET 4363.

EET 4370 Digital Computers 1
(4 QH) Fall

Introduces the field of digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean Algebra applications to computer design. *Prereq.* EET 4314.

EET 4371 Digital Computers 2
(4 QH) Winter

Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor. Assigns an assembly language coding problem and analyzes a suitable topic from the current literature. *Prereq.* EET 4370.

EET 4377 Control Engineering 1
(4 QH) Fall, Winter

Analyzes linear servomechanisms under both transient and steady-state conditions. Topics include signal flow graphs and Laplace transforms used in the formulation of block diagrams, and transfer function. *Prereq.* EET 4354 and MTH 4122.

EET 4378 Control Engineering 2
(4 QH) Winter, Spring

Studies system stability, root locus techniques, treatment of Nyquist criteria, and Bode diagram methods for systems evaluation. *Prereq.* EET 4377.

EET 4381 Telecommunications Systems 1
(4 QH) Fall

Presents transmission system fundamentals, beginning with the development of the information to be transmitted in the form of voice, video, or data signals. Examines information transmission including baseband and multiplex systems. Stresses encoding analog signals into a digital format and multiplexing digital signals into the digital hierarchy. Also examines current digital transmission systems such as T-carrier, digital radio, and fiber optic systems. (Not open to electrical engineering technology majors.) *Prereq.* EET 4152 or equiv.

EET 4382 Telecommunications Systems 2
(4 QH) Winter

Introduces switching theory and practice, historical development, and circuit switching. Examines packet switching and the basics of traffic engineering. Considers time division versus space division switching, switching systems software, and digital switch architecture. (Not open to electrical engineering technology majors.) *Prereq.* EET 4381.

**EET 4383 Telecommunications Systems 3
(4 QH) Spring**

Continues EET 4381 and EET 4382 by examining networks comprised of switching and transmission equipments. Considers networks of particular interest to students, including the interaction between private (PABX or key systems) networks and the public (local telephone company) network. Discusses signaling systems that communicate between portions of the network. Involves developing a transmission level plan that will tie together the subject matter. (Not open to electrical engineering technology majors.) *Prereq.* EET 4382.

**EET 4384 Video Communications
(4 QH) Fall**

Examines the television signal, synchronization, balancing and interleaving, cameras, transmitters and receivers, video cassette recorders, video discs, and cable networks. (Not open to electrical engineering technology majors.) *Prereq.* EET 4151, EET 4180, and PHY 4119.

**EET 4391 Basic Optics and Optical Systems Design
(4 QH) Fall**

Involves developing the basics of optical imaging in the Gaussian approximation and analyzing the various designs stemming from lens aberration, intent and forms of optical systems, and flux throughput. Presents the essentials of a wave description of light along with instrumental designs for exhibiting interference and diffraction. Assumes no previous background in optics. *Prereq.* MTH 4108 and PHY 4119.

**EET 4392 Optoelectronics and Fiber Optics
(4 QH) Spring**

Presents an overview of the various elements and their characteristics utilized in optical communication systems—elements that generate light (lasers, diodes); modulate light (as in scanning or information encoding); transfer light (optical fibers); detect light; and display and store light or its encoded information. *Prereq.* EET 4393 and MTH 4108.

**EET 4393 Applied Wave Optics
(4 QH) Winter**

Offers a wave optical approach to classical and modern imaging, and to interference/diffraction instrumentation and devices. Emphasizes a physically descriptive analysis of such applications as nondiffractive interference effects (interferometers, interference filters, high and anti-reflection films, and longitudinal 'laser' cavity modes) and diffraction effects (apertures and gratings). Also discusses wave imagery, image processing, and the 3-D imaging of holography; polarization phenomena and associated materials and devices; and basic quantum optics. *Prereq.* EET 4391, MTH 4108, and PHY 4119 or permission of instructor.

EET 4399 Special Problems in Electrical Engineering Technology (4 QH) TBA

Engages students in theoretical or experimental work under individual faculty supervision.

Prereq. Permission of department chair.

English

**ENG 4110 Critical Writing 1*
(3 QH) All Quarters**

Offers a detailed examination of the principles and methods of rhetoric, especially narration, description, and exposition. Coursework includes frequent practice in writing paragraphs and themes in those modes. *A writing proficiency test is given at the first class meeting.*

**ENG 4111 Critical Writing 2*
(3 QH) All Quarters**

Further examines the principles and methods of rhetoric, especially persuasion and argument, the study of short fiction, and the development of research skills. Coursework includes practice in writing persuasive and critical themes and preparing research papers. *Prereq.* ENG 4110 or equiv.

General Engineering Technology

GET 4100 Computer Programming for Engineering Technology (4 QH) All Quarters

Introduces the use of computers for problem solving using FORTRAN 77. Topics include flowcharts, DO loops, arrays, subroutines, functions, and character manipulations. Students use the University's computer facilities to run program assignments. *Prereq.* MTH 4108.

**GET 4120 COBOL
(4 QH) TBA**

Studies the COBOL language through its applications in business problems. Covers basic concepts quickly, emphasizing the more advanced topics of table handling; sorting; and sequential, index, random, and dynamic file processing. Requires an extensive project. (Not open to students who have taken CT 4320.) *Prereq.* None.

GET 4138 Computer Programming for Telecommunications (4 QH) Winter

Introduces the major components of the computer and how they function together. Topics include algorithms, programming philosophy, and flow

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charts. Studies a high-level language to enable students to write programs and run them on the University's computer system. *Prereq. None.*

GET 4144 Introduction to Personal Computer
(4 QH) TBA

Explores the use, capabilities, and limitations of the DOS operating system and popular application software packages such as Lotus 1-2-3, dBase III, and RELAY. Requires writing and running programs in the BASIC programming language using the University's computers. Discusses costs and benefits of different personal computer configurations and expansion options. (Not open to students who have taken CT 4344.) *Prereq. None.*

GET 4170 Engineering Graphics 1
(4 QH) All Quarters

Introduces students to freehand, instrument, and computer engineering drawing using geometric constructions. Topics include descriptive geometry; orthographic projection; sections; and isometric, oblique, and perspective drawings. *Prereq. None.*

GET 4171 Engineering Graphics 2
(4 QH) Fall, Winter, Spring

Studies the use of computer and manual drawing in layout and assembly graphics. Course topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Requires a design project. *Prereq. GET 4170.*

GET 4172 Electrical Engineering Graphics
(4 QH) Fall, Winter, Spring

Introduces manual and computer electronic graphics, including symbols, schematics, block and logic diagrams, production and cable drawings, and military standards. Also covers single- and double-sided printed circuit layouts, integrated circuits, electromechanical designs, wiring, and interconnection diagrams, and graphical data presentation. *Prereq. GET 4170.*

GET 4306 Technical Communications
(3 QH) Fall, Winter, Spring

Offers an opportunity to learn the style and content guidelines for technical writing, refines technical writing skills, and develops the ability to prepare and deliver oral presentations of a professional calibre. *Prereq. ENG 4110.*

GET 4364 Kinematics
(4 QH) Winter

Presents four-bar linkages, sliders, and other devices using orthogonal components of vectors, instantaneous centers, equivalent linkages, and effective cranks. Emphasizes graphic solutions, and provides an introduction to the computer to enhance these concepts. Also covers reverted and epicyclic gear trains and cam displacement. *Prereq. GET 4171 and PHY 4117.*

Human Resources Management

HRM 4301 Organizational Behavior*
(3 QH) Fall

Examines the fundamentals of organizational life, emphasizing the structure and discipline of groups typically found in a business setting. Topics include issues and data related to leadership styles, employee motivation, and organizational dynamics. Significant student participation is required. *Prereq. None.*

Industrial Engineering Technology

IIS 4360 Engineering Economy
(4 QH) Fall

Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and the analysis of income statements and balance sheets. Discusses introductory steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq. MTH 4107.*

IIS 4393 Engineering Probability and Statistics
(4 QH) Winter

Studies the algebra of events and sets, and the laws of probability. Examines the properties of discrete and continuous random variables, including density function, expected value, variance, conditional probability, independent event, and Bayes' theorem. Presents common distributions: normal, uniform, and binomial. Also covers random variables, point estimation, confidence intervals, sampling statistics, central limit theorem, and associated sampling distributions. *Prereq. MTH 4122.*

Industrial Management

IM 4301 Introduction to Operations Management*
(3 QH) Winter

Surveys the concepts and principles of operations from a management point of view. Looks at operations in relation to other business functions and as a transformation process, with inputs of materials, investment, and people producing finished goods/services. Topics include product and process

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design, forecasting demand, capacity planning, facilities design, aggregate planning, scheduling, and quality control and assurance.

Prereq. MS 4325 or equiv.

IM 4314 Productivity Enhancement and Quality* (formerly Production Control and Inventory Management) (3 QH) Fall

Studies the fields of quality control and productivity as a body of managerial, technological, behavioral, and economic knowledge, and examines the organized application of this knowledge to the practical improvement of operations. Considers current productivity improvement programs such as measurement and control, and explores the relationship between increased productivity and managing for higher quality. Reviews current management practices of quality control, approaches to optimizing quality, economics of total quality, internal and external quality, and management of long-term quality and reliability. *Prereq.* MS 4332.

Mechanical Engineering Technology

MET 4301 Mechanics A

(4 QH) Fall

Studies the forces, moments, couples, and statics of particles and rigid bodies in two and three dimensions. Examines external and internal distributed forces, first moments and centroids, as well as structure-trusses, frames, and machines. *Prereq.* MTH 4120 and PHY 4117.

MET 4302 Mechanics B

(4 QH) Winter

Explores friction, second moments, and virtual work; the kinematics of particles; force, mass and acceleration; work and energy. *Prereq.* MET 4301.

MET 4303 Mechanics C

(4 QH) Fall

Studies the impulse and momentum of particles; the kinematics and dynamics of rigid bodies, force, mass, and acceleration; and the dynamics of rigid bodies—work and energy. Also covers mechanical vibration. *Prereq.* MET 4302.

MET 4314 Stress Analysis A

(4 QH) Winter, Spring

Examines axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, indeterminate members, thin-walled pressure vessels, and centric loading of bolted and welded connection. Other topics include shear and

moment beams; eccentrically loaded connections; and flexural and transverse shearing stresses in beams. *Prereq.* MET 4301.

MET 4315 Stress Analysis B

(4 QH) Fall, Spring

Presents determinate and indeterminate beam deflections and reactions by integration and area moment methods. Topics include torsional stresses and strains; power transmission; eccentric loads on struts, beams, riveted and welded joints; combined stresses; principal stresses; Mohr's circle; and theories of failure. *Prereq.* MET 4314.

MET 4319 Mechanics

(4 QH) Spring

Provides an introduction to mechanics for nonmechanical majors. *Prereq.* MTH 4120 and PHY 4117.

MET 4330 Mechanical Design A

(4 QH) Winter

Introduces the principles of mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering through simple design projects. Examines principles of design, properties, and selection of materials; stress concentrations; strength under combined stresses; theories of failure; impact; and fluctuating and repeated loads. *Prereq.* MET 4314 and MET 4380.

MET 4331 Mechanical Design B

(4 QH) Spring

Studies the deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Covers stresses and power transmission of spur, bevel, and worm gear; shaft design, and clutches and brakes. *Prereq.* MET 4330.

MET 4340 Thermodynamics A

(4 QH) Fall, Winter

Introduces the general theory of heat and matter; laws of thermodynamics; energy-transformation principles and availability of energy; and properties and processes for pure substances and ideal gases. Also covers thermodynamic properties and processes of liquids and vapors; tables and charts; mixtures of fluids; and vapor cycles. *Prereq.* CHM 4111 and PHY 4118.

MET 4341 Thermodynamics B

(4 QH) Winter

Discusses the theory of vapor engines and analysis of types of actual engines using compression of gases and vapors; internal combustion engines; theory of gas and vapor flow through orifices and nozzles; design and performance of steam and gas turbines; spark-ignition and compression-ignition engine design and performance; and fan performance. *Prereq.* MET 4340.

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MET 4342 Refrigeration and Air-Conditioning (4 QH) Spring

Introduces air-conditioning principles, including psychometrics and heat pumps. Topics include calculation of heating and cooling loads in accordance with ASHRAE practices; principles of gas compression; analysis of vapor compression; refrigeration systems; low-temperature refrigeration cycles; and absorption refrigeration systems. *Prereq. MET 4341.*

MET 4343 Heat Transfer (4 QH) Fall

Presents the basic principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, the basic equations of conduction, and natural and forced convection. Studies the hydrodynamic and thermal boundary layers, black body radiation, and Kirchoff's law. Other topics include emissivity and absorptivity, the radiation between simple bodies, heat transfer coefficients, heat exchanger effectiveness, and regenerative and evaporative heat exchangers. *Prereq. MET 4341.*

MET 4344 Energy Systems Theory and Hydronics (4 QH) Spring

Discusses the elementary principles of heat transfer; heat loss calculations of buildings; HVAC fundamentals; and architectural technology and building materials. Also covers the election of heat transmission coefficients, instrumentation, heat transfer coefficients, heating load, combustion, and venting. Instruction includes the study of basic hydraulics and hot water heating, fluid flow, pumps, boilers, and forced circulation. *Prereq. GET 4170 and MTH 4108.*

MET 4345 Heating, Ventilating, and Air-Conditioning 1 (4 QH) Spring

Examines fundamental design data on HVAC including climatic data, temperature variations, weather maps, heat gains from sun, industrial degree days, and city and well water temperature variations. Discusses gains and losses from other sources; requirements for industrial plants and office and commercial buildings; and overall heat transmission coefficients. *Prereq. MET 4341.*

MET 4346 Heating, Ventilating, and Air-Conditioning 2 (4 QH) Fall

Explores the properties of moist air and interprets air-conditioning processes on the psychometric chart. Topics include air distribution; outlet performance; volume control; noise limitations; selection and location of surface outlets; flow measuring devices; and system balancing. Develops designs of complete ductwork systems for both high and low velocity systems. Includes flow duct design, centrifugal fans, air cleaning, radiant heating, and heat pump. *Prereq. MET 4345.*

MET 4347 Distribution Systems for Mechanical Systems (4 QH) Fall

Develops distribution and/or collection systems for the layout of ducts and pipes for heating, ventilation, air-conditioning, water supply, and plumbing networks based on theoretical consideration. Emphasizes empirical approaches used within the industry. Includes codes and standards relating to materials selection and estimating aspects. *Prereq. MET 4345.*

MET 4348 Energy Conservation (4 QH) Winter

Analyzes a given building envelope with fixed parameters, considering heat gains and losses and energy consumption from various sources. Examines techniques for investigating and improving energy conservation factors and influencing energy costs and management. Uses these concepts to develop energy auditing techniques. *Prereq. MET 4347.*

MET 4349 Heating, Ventilating, and Air-Conditioning Systems Design (4 QH) Spring

Examines a building with fixed parameters to show how heating, ventilating, and air-conditioning systems' main unit sizes are selected and how the various working substances are distributed into the building. Involves presenting plans and schematics of the final design necessary to install the systems. *Prereq. MET 4348.*

MET 4350 Heating, Ventilating, and Air-Conditioning Laboratory (3 lab, 2 QH) Fall

Involves lab experiments on the variation of water and air flows in pipe and duct systems, and measurements of the efficiency of fan systems under various outlet conditions. Considers the basic operating conditions of heating and refrigeration systems along with the heat transfer conditions of pipe/duct insulation and fin coil systems. *Prereq. MET 4345.*

MET 4370 Fluid Mechanics A (4 QH) Spring

Examines hydrostatics; principles governing fluids at rest; pressure measurement; hydrostatic forces on submerged areas and objects; simple dams; fluids in moving vessels; and hoop tension. Discusses fluid flow in pipes under pressure; fluid energy, power, and friction loss; Bernoulli's Theorem; and flow measurement. *Prereq. MET 4302.*

MET 4371 Fluid Mechanics B (4 QH) Winter

Considers pipe networks and reservoir systems, flow in open channels, and uniform flow. Also covers energy, friction loss, minor losses, velocity distribution, alternate stages of flow, critical flow, nonuniform flow, accelerated and retarded flow, and hydraulic jump and waves. *Prereq. MET 4370.*

MET 4380 Materials A**(4 QH) Spring**

Studies fundamental metallic structures, general metallurgical information covering theoretical aspects of properties, and testing and failure of metals. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and principles of metal fabrication. *Prereq. None.*

MET 4390 Measurement and Analysis Laboratory
(3 lab, 2 QH) Fall

Discusses experiments requiring collection and analysis of data by graphical and numerical methods. Examines computer applications and report writing to draw conclusions relative to accuracy, precision, true values, and measured values as they relate to basic mechanical measuring instruments. *Prereq. GET 4100, MET 4314, MTH 4122, and PHY 4119.*

MET 4391 Technology Laboratory A**(3 lab, 2 QH) Winter**

Conducts experiments to determine mechanical properties of materials under normal and abnormal environmental conditions. Examines the effects of homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq. MET 4315, MET 4380, and MET 4390.*

MET 4392 Technology Laboratory B**(3 lab, 2 QH) Spring**

Conducts experiments to determine the physical properties of incompressible fluids, measure flow rates and velocities utilizing pitot tubes, orifice plates, venturii meter, and weirs flow meters, U-tube differential manometers, and piezometers. *Prereq. MET 4370 (may be taken concurrently) and MET 4390.*

MET 4393 Technology Laboratory C**(3 lab, 2 QH) Fall**

Explores basic thermodynamic relationships. Conducts experiments to examine the flow of compressible fluids and steam and to examine the energy conversion of a fuel into a working substance. Examines related heat transfer mechanisms along with operating characteristics of thermal generators, engines, and compressors. *Prereq. MET 4341 and MET 4390 (may be taken concurrently).*

MET 4394 Technology Laboratory D**(3 lab, 2 QH) Winter**

Conducts experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, mean effective pressure, fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems. Also covers energy conversion of fuels. *Prereq. MET 4341, MET 4343 (may be taken concurrently), and MET 4393.*

MET 4395 Technology Laboratory E**(3 lab, 2 QH) Spring**

Offers advanced and specialized experiments in refrigeration, air-conditioning, and heating pump cycles. *Prereq. MET 4342, MET 4343, and MET 4390.*

MET 4414 Mechanical Vibrations**(4 QH) TBA**

Studies the elements of vibrating systems, one degree of freedom, natural frequencies, damped free and forced vibration, impedance and mobility, systems with more than one degree of freedom, influence coefficients, Lagrange's equations, generalized coordinates, and vibration absorber. *Prereq. MET 4303.*

MET 4415 Experimental Stress Analysis**(4 QH) TBA**

Examines theory and experimentation showing the application of extensometers and electrical strain gauges and transducers in the field of experimental stress and strain analysis. Also covers theory and laboratory practice on photoelastic methods as applied to classical model analysis and modern coating analysis. *Prereq. MET 4315.*

MET 4416 Stress Analysis C**(4 QH) Spring**

Discusses curved beams, nonsymmetrical bending of beams, shear center and shear stresses on thin sections, and composite beams. Also covers columns, energy absorption and resilience, inertial stresses, impact loading, deflection of beams by energy methods, and bolted fastenings. *Prereq. MET 4315.*

MET 4444 Power Generation**(4 QH) TBA**

Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Emphasizes the analysis of thermodynamic cycles as well as the practical deviations from the related ideal processes. Considers accessory and auxiliary equipment used in such systems. Studies design, performance, economic factors, and public issues affecting electric power generation. *Prereq. MET 4341.*

MET 4481 Materials B**(4 QH) Spring**

Discusses inorganic materials, materials having electrical and magnetic properties, and applications for the fabrication and use of both metals and nonmetals. Examines structures of metals, imperfections, and phase diagrams. Explores the effect of temperature on structure and properties of metals along with strengthening mechanisms and the mechanical properties of nonferrous metals. Offers experiments in preparation of samples, selection, polishing, and etching. Involves completing an examination of nonferrous metals and additional

lab work in the construction of cooling curves and binary phase diagrams. *Prereq. MET 4380.*

MET 4482 Applied Metallurgy
(4 QH) TBA

Examines mechanical properties of ferrous metals, the iron carbon diagram, high-temperature alloys, hardening methods, impact tests, and the effects of environment. Also discusses manufacturing processes and methods of fabrication. Offers experiments in the analysis of stress-strain diagrams, heat treatment, surface corrosion, tempering, and drawing, as well as ferrous and nonferrous metals. *Prereq. MET 4481.*

Manufacturing Engineering Technology

MFG 4311 Manufacturing Materials and Processes 1 (4 QH) Spring

Examines the structures of polymers (thermoplastics, thermosetting, glass, and rubber); manufacturing processes for polymers; thermoforming; structures of metals; and the manufacturing processes for metal forming. Also covers alloys, nonferrous metals, and various manufacturing methods and processes. *Prereq. CHM 4101 or CHM 4111, and PHY 4117.*

MFG 4312 Manufacturing Materials and Processes 2 (4 QH) Fall

Continues MFG 4311. *Prereq. MFG 4311.*

MFG 4321 Computer-Aided Manufacturing 1
(4 QH) Fall

Gives an overview of computer-aided manufacturing (CAM), including group technology; material requirements planning; part coding and classification; numerical control; part programming; and management systems. Covers each area to instill an appreciation of the coming reality of the automated factory. *Prereq. None.**

MFG 4322 Computer-Aided Manufacturing 2
(4 QH) Winter

Continues MFG 4321. *Prereq. MFG 4321.*

MFG 4331 Computer Methods in Manufacturing Design 1 (4 QH) Fall

Investigates the use of computers in selected areas of manufacturing systems design. Topics include numerical control, MRP II, computer-aided process planning and control, and other important applications of computers to manufacturing. *Prereq. MFG 4311 and MFG 4322.*

MFG 4332 Computer Methods in Manufacturing Design 2 (4 QH) Winter

Continues MFG 4331. *Prereq. MFG 4331.*

MFG 4341 Introduction to Computer-Aided Design
(4 QH) Winter

Introduces computational and numerical geometry for design, and studies the implementation of computer graphics in design and use of computer-aided design packages, as well as principles of numerical control techniques in design and manufacture. Involves a design project. *Prereq. CT 4105 or FORTRAN.*

MFG 4351 Assembly Automation
(4 QH) Spring

Examines the field of automatic assembly; topics include automatic vibratory feeders, nonvibratory feeders, and the automatic orientation of parts to be fed. Also covers the economics of automatic assembly. Involves designing an automated assembly system if time permits. *Prereq. MFG 4322 and MFG 4332.*

MFG 4361 Numerical Controlled Machines (Basic)
(4 QH) Fall

Begins with a week-long review of numerical controlled machines from material covered in MFG 4321 and MFG 4322. Provides an introduction to DNC and CNC systems followed by the study of numerical controlled machines and programming in the APT programming language. *Prereq. MFG 4322, MFG 4332, and MFG 4341.*

MFG 4371 Robotics
(4 QH) Winter

Discusses the concept, classification, and structure of robots and their application in manufacturing. Topics include drive and control systems; kinetics, coordinate transformations, and trajectory interpolators; and the application, programming, and integration of robots into the manufacturing environment. *Prereq. MFG 4361.*

MFG 4381 Plant Layout and Design
(4 QH) Fall

Examines the use of descriptive and optimizing models—for example, simulation, queuing theory, and linear programming—to design facilities and associated material handling systems. Applies computer-assisted layout analysis techniques to practical problems. *Prereq. IM 4301.*

Management

MGT 4101 Introduction to Business and Management 1* (3 QH) All Quarters

Examines the setting and general structure of American business, including objectives and practices affecting the American standard of living. Topics include the characteristics of private enterprise and the nature and challenge of capitalism and other forms of economic enterprise. Introduces

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types of businesses, the structures of organizations, and the functions of management. Considers what a managerial career involves, what problems must be faced, and what decisions must be reached.
Prereq. None.

Management Science

MS 4332 Statistical Quality Control* (3 QH) Winter

Offers a practical course in analytical methods of modern quality control, emphasizing the application of basic statistical controls in the industrial environment. Topics include control charts, statistical tolerancing, acceptance sampling techniques, life testing, and reliability concepts.

Prereq. ECN 4251 or equiv.

Mathematics

MTH 4006 Technical Mathematics (4 QH) All Quarters

Reviews high school algebra equations, formulas, exponents, polynomials, factoring, scientific notation, fractions, radicals, complex numbers, quadratic equations, and linear equations. (Credit cannot be used in the associate in engineering, associate in science, or the bachelor of engineering technology degree programs.) *Prereq.* None.

MTH 4107 College Algebra (4 QH) All Quarters

Offers a diagnostic exam to insure the proper placement of students in the course. Course topics include interval notation, integer and rational exponents, factoring, operations with fractional expressions, operations with radicals and complex numbers, Pythagorean theorem, linear and quadratic equations and inequalities, distance and midpoint formulas, and functional notation. Also covers graphing of functions including straight lines, absolute value, polynomials, exponential and logarithmic; solving equations involving radicals; and solving polynomial, exponential, and logarithmic equations. Involves use of scientific calculator. *Prereq.* Math diagnostic exam or MTH 4006 or equiv.

MTH 4108 Pre-Calculus (4 QH) All Quarters

Examines trigonometric functions of angles in degrees and radians; trigonometric identities and

equations; right triangles; law of sines and cosines; inverse trigonometric functions; polar coordinates; complex numbers in trigonometric form; systems of linear and nonlinear equations; determinants; binomial theorem; arithmetic and geometric sequences and series; and conic sections.

Prereq. MTH 4107.

MTH 4120 Calculus 1 (4 QH) All Quarters

Studies plane analytic geometry of the line and circle. Reviews inequalities and general function operations, theory and evaluation of limits, derivatives of algebraic and trigonometric functions, general rules of differentiation, Rolle's theorem, and Mean Value theorem. Also covers applications of differentiation including velocity; and acceleration, related rates, maximum, minimum, curve sketching, and approximations by differentials. Examines solving the equation $f(x) = 0$ by applying Newton's method.

Prereq. MTH 4108.

MTH 4121 Calculus 2 (4 QH) All Quarters

Examines antiderivative and development of the fundamental theorem with applications to areas, volumes, and rectilinear motion problems. Topics include the logarithmic exponential and inverse trigonometric functions and their applications; techniques of integration including parts, partial fractions, substitution, and the use of tables; numerical integration (Simpson's and Trapezoidal rules); L'Hospital's Rule; improper integrals; and the geometry of vectors in a plane and space.

Prereq. MTH 4120.

MTH 4122 Calculus 3 (4 QH) All Quarters

Studies three-dimensional space and a treatment of functions of several variables; multiple integrals with applications in areas and volumes; sequences and series; and differential equations, including the solution with applications of first-order with variables separable, first-order linear, and second-order linear homogeneous to complete the sequence.

Prereq. MTH 4121.

MTH 4123 Differential Equations (4 QH) Fall, Winter, Spring

Examines linear differential equations with constant coefficients, homogeneous and nonhomogeneous. Explores the variation of parameters and undetermined coefficients and simultaneous differential equations, the Laplace transform, series solution of differential equations, and the Fourier series. Studies orthogonal functions and numerical solutions of differential equations.

Prereq. MTH 4122.

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Physics

PHY 4101 College Physics 1 (4 QH) Fall, Summer

Introduces students to mechanics, including units of measurement, vectors, accelerated motion, and Newton's laws of motion. Topics include conservation of energy, work, momentum, elements of heat, mechanical waves, and vibrating bodies. Includes laboratory experiments and classroom demonstrations as an integral part of the course. (This course is intended for health professions and science programs and cannot be used for credit towards technology degrees in the School of Engineering Technology.) *Prereq.* None.

PHY 4102 College Physics 2 (4 QH) Winter, Summer

Introduces magnetism, magnetic fields, electromagnetic induction, electrostatics and electric circuits. Discusses appropriate topics in optics, nuclear and atomic physics. Involves frequent laboratory experiments and classroom demonstrations. (This course is intended for the health professions and science programs and cannot be used for credit towards technology degrees in the School of Engineering Technology.) *Prereq.* PHY 4101.

PHY 4117 Physics 1 (4 QH) All Quarters

Introduces vectors and balanced forces, accelerated motion, Newton's laws, projectile motion, work and energy, momentum, angular motion, centripetal force, rotation of rigid bodies, and moment of inertia. *Prereq.* MTH 4107 or concurrently.

PHY 4118 Physics 2 (4 QH) All Quarters

Explores elasticity, density and pressure, temperature, the gas laws, heat transfer, thermodynamics, vibratory motion, wave motion, properties of sound, and properties of light. *Prereq.* PHY 4117.

PHY 4119 Physics 3 (4 QH) All Quarters

Covers electric forces and fields, electric potential, direct current circuits, magnetic forces and fields, electromagnetic induction, and alternating current circuits. *Prereq.* PHY 4118.

PHY 4173 Physics Laboratory 1 (2.3 lab, 2 QH) Winter, Summer

Offers experiments in mechanics, elastic deformation, work, energy, thermometry, and calorimetry. *Prereq.* PHY 4117.

PHY 4174 Physics Laboratory 2 (2.3 lab, 2 QH) Spring, Summer

Continues PHY 4173. Offers experiments in gas laws, wave motion, optics, electrical circuits, and nuclear and atomic physics. *Prereq.* PHY 4173.



Northeastern University



A Profile of Northeastern

At Northeastern University, we value part-time evening and weekend students as highly as we do our full-time students. You are important members of the academic community and reflect the changing profile of today's college student, which encompasses new concerns for lifelong learning and professional retraining. Northeastern supports your pursuit of personal and professional goals and wants to contribute to your success. In return, you contribute to the intellectual and cultural diversity upon which this urban institution thrives. You may take full advantage of the academic resources and facilities we offer and join all our students who are recognized and supported by the University's faculty and administration.

Founded in 1898, Northeastern University is incorporated as a privately endowed, nonsectarian institution. From its beginning, the University's mission has been to identify and address the educational needs of a diverse community and student body in distinctive and useful ways. Northeastern did not duplicate the programs of other academic institutions, but instead became a world leader in new areas of educational service. Today, the University is comprised of eight undergraduate colleges and ten graduate schools. Our undergraduate colleges are:

- Boston-Bouvé College of Human Development Professions
- College of Arts and Sciences, including the School of Journalism
- College of Business Administration
- College of Computer Science
- College of Criminal Justice
- College of Engineering, including the School of Engineering Technology
- College of Nursing
- College of Pharmacy and Allied Health Professions

Our graduate schools are:

- Graduate School of Arts and Sciences
- Graduate School of Boston-Bouvé College of Human Development Professions
- Graduate School of Business Administration

- Graduate School of Computer Science
- Graduate School of Criminal Justice
- Graduate School of Engineering
- Graduate School of Nursing
- Graduate School of Pharmacy and Allied Health Professions
- Graduate School of Professional Accounting
- School of Law

At Northeastern, we respond to the needs of people who already hold jobs or are launched in careers but who wish to advance or change their professional lives. There are also classes for people pursuing personal interests. The University offers a variety of educational options—both credit and noncredit—to suit your particular objectives. The School of Engineering Technology offers part-time evening and weekend associate's and bachelor's degree programs in technological areas, in addition to daytime undergraduate programs. University College, so named because it draws upon the resources of Northeastern's other colleges, offers part-time day and evening programs leading to certificates and to associate's and bachelor's degrees.

All formal courses of study leading to degrees through part-time programs are approved by the full-time day faculty of Northeastern's Basic Colleges and are governed by the same qualitative and quantitative standards.

Where You'll Find Northeastern

The main campus of Northeastern University is a vibrant and progressive urban community. To all Northeastern students, the physical setting of the Boston campus extends opportunities to participate in the dynamic, exciting environment that we share with city residents. Built around a quadrangle, the campus is divided by Huntington Avenue, a major artery. It is located in the midst of such cultural landmarks as Symphony Hall, the Museum of Fine Arts, the Isabella Stewart Gardner Museum, Horticultural Hall, and the

Boston Public Library. You can walk to Frederick Law Olmsted's Fenway Park, Copley Place, the Back Bay shopping district, and a number of internationally renowned hospitals. In 1910, the University began construction on the first piece of land acquired at its present site; it is now more than fifty-five acres.

The Boston campus is ideally situated for easy commuting. The MBTA Orange and Green lines provide rail service to the heart of the campus. Use either the Orange Line's Ruggles Street station or the Green Line's Northeastern University stop along the Arborway Branch to arrive on campus. The MBTA also has numerous bus routes that run along Huntington and Massachusetts avenues, which are the two major city streets closest to the campus. Finally, if you need to drive to Northeastern, student parking is available at reasonable rates in University-owned parking lots.

To reach increasing numbers of students and to make participation in our programs as convenient as possible, Northeastern University has established a number of suburban campuses and branch locations, as well as several off-campus athletic facilities. The campuses and branch locations house administrative and classroom facilities for Northeastern's graduate, part-time day and evening, and continuing education programs. The University also maintains many affiliations to ensure access to facilities and specialized equipment available at other institutions and organizations.

One of Northeastern's most recent acquisitions is the twenty-acre Dedham campus, just north of Route 128. This facility houses the Center for Continuing Education and space for the College of Business Administration's High Technology MBA Program.

Near the junction of Routes 128 and 3 in Burlington is the Suburban Campus of Northeastern University. Part-time undergraduate courses in a variety of subject areas and part-time graduate courses in engineering and business administration are offered. The Burlington campus also offers special programs for part-time, evening, and noncredit continuing education courses.

Situated on fifty acres in Ashland, the Warren Center provides a practical laboratory for outdoor education and conservation and for camping administration, programming, and counseling. In the summertime, the center becomes an attractive campsite for various community and University groups and is available for conferences and workshops.

Twenty miles northeast of Boston, the Marine Science and Maritime Studies Center is located in Nahant, on Massachusetts Bay. It serves as a site for national, international, and University research.

Henderson House, Northeastern University's conference center, is located twelve miles from Boston in suburban Weston. This facility hosts a variety of activities, including residential seminars, workshops, short courses, and weekend meetings.

Network Northeastern

A unique extension of the University is available to you via Network Northeastern. The network uses the microwave-based Instructional Television Fixed Service (ITFS) system to telecast live classroom instruction (in color) on four channels from the Boston campus to off-campus students within a forty-mile radius. Telecasts are delivered daily between 8 AM and 10 PM.

Current Network Northeastern course offerings include graduate engineering, graduate computer science, state of the art professional development courses, undergraduate engineering technology, arts and sciences, and noncredit one- and two-day seminars.

At thirty-eight company sites and two suburban campuses, students view the telecasts in reception rooms equipped with television monitors and a telephone-based talkback system. Thus, students off campus can participate as fully as those on campus. A courier service collects and delivers homework assignments and serves as the off-campus student's link to the bookstore, registrar, and other Northeastern offices.

University Libraries

As a reflection of our serious commitment to part-time students, you have full access to the University Libraries located on the Boston, Burlington, and Dedham campuses and at the Marine Science Center in Nahant.

During summer 1990, a central library for the Boston campus opens for service; it is the largest academic library building in Boston. A five-level structure with 2,700 seats and shelving for more than 1.25 million volumes, the library's capacities for both seating and on-site

collections are triple those of the previous main facility. The new library houses the latest in on-line, telecommunications, and media resources, including computer-assisted instruction, microcomputer facilities, and language and music listening laboratories.

Total holdings of the University Libraries include more than 600,000 volumes, 1,400,000 microforms, current subscriptions to over 6,400 serials and newspapers, 250,000 government documents, and 15,000 audiovisual and computer software titles.

Library staff are available in all service areas to assist students. Librarians provide instruction to groups and individuals on the bibliographic research process and on strategies for locating and using library resources. Each quarter, a series of tutorials gives students further opportunities to meet with a librarian and discuss individual research needs.

Northeastern University's membership in the Boston Library Consortium generally entitles our students to on-site use of libraries at Boston College; Boston Public Library; Boston University; Brandeis University; the Massachusetts Institute of Technology; the Massachusetts State Library; Tufts University, the University of Massachusetts at Amherst, Boston, and Worcester; and Wellesley College.

Engineering Computer Center

The Engineering Computer Center provides user support for Northeastern Engineering and Technology students and faculty. The staff are full-time professionals who administer the systems, deliver training, maintain hardware and provide software support. The center's labs, open seven days a week with competent user assistants available to answer questions, provide student access to PCs, Macintoshes, VAX and Sun Microcomputers, and high-end workstations for CAD and VLSI design.

Division of Academic Computing

The Division of Academic Computing (DAC) facilitates the use of computers by Northeastern students and faculty.

The division's Personal Computing Initiative supports personal computing with negotiated

discounts on hardware and software (available through the Northeastern Computer Store) and with advice, training, and assistance on personal computer use.

The division and its Computing Resource Center (CRC) maintain the *lynx* communication system for the exchange of computer mail and conference discussions. Participation in *lynx* is available to any member of the Northeastern community free of charge. To apply for a *lynx* account, bring a valid Northeastern student identification card to 39 Richards Hall during business hours.

The Computing Resource Center also maintains mainframe computing resources (most notably the VAX 8650 system) and numerous public-access laboratories of personal computers and terminals on the Boston, Dedham, Burlington, and Liberty Square campuses. ACCESS, the newsletter of the division, appears seven times a year and includes the locations and facilities of the laboratories and news about other DAC and CRC services.

Ell Student Center

Students enjoy a variety of recreational and co-curricular activities at the Carl S. Ell Student Center. The center houses Blackman Auditorium, which seats 1,300; a ballroom; main lounge; student offices; conference rooms; PC lab and typing room; full-service copy center; gameroom; cafeteria with seating for more than 1,000; and the University Bookstore.

Sport, Dance, and Exercise Facilities

Northeastern is concerned with providing for the health and fitness of students and continually expands the sports, exercise, and recreational options available. All part-time students have access to extensive gymnasium facilities from 4:00 PM to 9:30 PM, Monday through Friday, and during all open hours on Saturday, Sunday, and holidays. The University offers a variety of specialized facilities, including basketball courts, dance studio, indoor athletic field and running track, gymnastics room, combatives room, weight-training rooms, swimming pool, crew practice tank, racquetball courts, tennis

courts, and motor performance and exercise physiology laboratories. The Matthews Arena, with seating for more than 5,000 fans, is home to the University's varsity and subvarsity hockey and basketball teams.

For organized athletics requiring facilities not available on the main campus, Northeastern maintains the Northeastern University Boat House, which is located on Memorial Drive in Cambridge and is home to the University's crew teams. The Edward S. Parsons Field, on Kent Street in Brookline, is the playing ground for the football, baseball, women's lacrosse and women's field hockey teams, and some intramurals. The Bernard M. and Jolane Solomon Track, a recently completed outdoor track and field facility in Dedham, has an eight-lane, Action Trak 200 running surface and an expansive area for concurrent jumping and field events. This new facility is ready to host dual and championship meet competitions and is a permanent site for Northeastern University track athletes.

You must present a valid Northeastern student identification card and a photo identification card for access to the facilities.

Social and Professional Clubs

We welcome and encourage part-time students in the School of Engineering Technology and University College to join in the social and professional activities that are organized and run by the student body, with the assistance of the director of the Office of University College–School of Engineering Technology Student Activities. If you and your peers are interested in starting new professional clubs, the office will help to plan and organize locally and nationally.

All programs are designed to keep pace with changing student needs and interests and to provide maximum opportunity for your participation.

Office of Services for the Handicapped

No student should miss or have diminished any of the opportunities at Northeastern. Any student who has a disability-related need, no matter how small or individual, can receive ready support

services from the Office of Services for the Handicapped (OSH). Frequently, students are uncertain about how they may be helped by this office; in these situations, a discussion of possible alternatives is useful. OSH provides a range of support services to eliminate the competitive disadvantages that a disability may create. Services are tailored individually to meet the needs of each student.

The OSH provides support during orientation, registration, and preregistration; an information clearinghouse; counseling; and services for the hearing-impaired, the wheelchair user or mobility-impaired, and students who are learning disabled.

The OSH is also the gathering place for the Disabled Student Organization of Northeastern University, which works cooperatively with OSH to plan programs and improve accessibility of services for people with disabilities at Northeastern.

Counseling and Testing Center

Confidential counseling and testing is available to full- and part-time students to address career, educational, or personal concerns. Assistance is available to all students during days and certain weekday evenings until 8:30 PM at the Counseling and Testing Center. For information and appointments, call 617-437-2142 or drop in at 302 Ell Building.

Lane Health Center

A comprehensive program of medical care is provided to all students registered in full-time Basic Colleges and Graduate School programs at the Lane Health Center, 135 Forsyth Building. There are staff physicians available on a walk-in basis Monday–Friday 9:00 AM–4:30 PM and a nurse is on duty at all times when the clinic is closed. An emergency telephone number 617-437-2772 is answered by the nurse on duty who will make appropriate arrangements for any urgent situation, nights, weekends and holidays.

Department of Career Development and Placement

The Department of Career Development and Placement provides a variety of professional development services to Northeastern students and alumni. The services enable students to plan for career advancement. Students already working in their chosen fields may receive assistance in identifying career paths and developing a network of professional contacts. Others may receive assistance with career placement.

The department is located on the Boston campus in 124 Ryder Hall. Counselors are available to students and alumni by appointment in Boston, and travel to the Burlington and Dedham campuses as well. For an appointment, call 617-437-2428. Office hours from September to June are 8:30 AM–4:30 PM Monday, Thursday, and Friday; and 8:30 AM–8:00 PM Tuesday and Wednesday. Office hours during July and August are 8:00 AM–5:30 PM, Monday through Thursday.

Free services are available to students and alumni and include career counseling and placement, a reference library with company files and employer contacts, an annual Career Expo during evening hours, a job bank of current employment opportunities, seminars and panels, and on-campus corporate recruiting for seniors.

Alumni Association

Upon graduation, you will join the more than 114,000 alumni united within the Alumni Association, which was established to promote a mutually rewarding relationship between Northeastern and its graduates. Association activities include the Homecoming celebration, presentation of the Outstanding Alumni Awards, and the annual presentation of Professional Promise Awards to outstanding seniors in each of the colleges.

Cooperative Plan of Education

The University is known worldwide for its Cooperative Plan of Education, under which students alternate periods of work and study. Our time-tested, widely acclaimed method of education enables students to gain valuable hands-on, practical experience in their chosen fields as an integral part of their college programs. The Co-op Plan also allows students to earn money that is used to offset tuition, or related costs. All of Northeastern's undergraduate day colleges operate on the Cooperative Plan, and several of the University's graduate schools have structured their programs to include the features of cooperative education.

Administrative Information

Admissions

The Student Body

The student body of the School of Engineering Technology is composed of both recent high school graduates and adults. Most students are employed in industry, with a range of vocational experience. They represent many technical career categories—industrial, engineering, scientific, and allied-medical, demonstrating that, in our increasingly complex society, the key to personal advancement is education.

Academic Background

A firm knowledge of the fundamentals of mathematics and science is necessary for success in the more advanced technological courses.

All applicants to the School of Engineering Technology are required to be proficient in both English and mathematics. In order to enroll in ENG 4110 Critical Writing 1 or MTH 4107 College Algebra, you must satisfactorily complete an English and a mathematics skills test.

Students who lack the required English or mathematics skills must take the appropriate review course. In addition, students who feel uncomfortable with the level of their English or mathematics skills are encouraged to enroll in review courses as well. The next paragraphs describe the review courses available at the School of Engineering Technology. The review courses are offered on a noncredit basis only.

ENG 4005, ENG 4006, and ENG 4007 English for International Students 1–3

This is a three quarter sequence of courses for foreign speaking students that provides intensive training in the English language. Students are introduced to English grammar, with an emphasis on listening, speaking, and writing. The preparation of written and oral reports, as well as business and social correspondence, is required. In the final quarter, advanced work in

written and spoken English prepares the students for ENG 4110 Critical Writing 1.

ENG 4011 Elements of Writing

This is a writing course that reviews English grammar, and offers practice in writing sentences, paragraphs, and short papers. The course prepares students for ENG 4110 Critical Writing 1.

MTH 4006 Technical Mathematics

This is a mathematics course that reviews high school algebra and prepares students for MTH 4107 College Algebra.

Program Counseling

If you are attending the School of Engineering Technology for the first time, we recommend that you meet with a program counselor who will assist you in planning an academic program. (If possible, please bring school transcripts to the counseling session.) Counselors are available evenings and Saturdays at the main campus in Boston most of the year; a special schedule is prepared for the summer. Counseling at the Burlington campus is scheduled at the beginning of each quarter. For further information, contact the School of Engineering Technology at 617-437-2500.

Special Students

Our open enrollment policy allows you to enroll in courses without making a formal application. As long as you have the proper prerequisites or their equivalent, you can enroll as a special student.

Degree Candidates

To graduate from the School of Engineering Technology you must be accepted as a degree candidate in a program. An application for degree candidate status is available from the

School of Engineering Technology office in Boston (120 Snell Engineering Center, 617-437-2500) and from our representative in Burlington.

To declare a major, you must do the following.

1. Complete sixteen quarter hours in the School of Engineering Technology degree program at a minimum cumulative quality-point average of 2.00 (a grade of C).
2. Present a high school diploma or its equivalent (GED).

Once your application for admission to a degree program is approved, a change of status will be recorded on your permanent record and any advanced standing credit will be posted.

Full-Time Students

In addition to the part-time programs described in this publication, the School of Engineering Technology offers full-time day cooperative education programs. Interested students can apply through the Office of Undergraduate Admissions, 617-437-2200.

Readmission

If you are a former student seeking readmission to the School of Engineering Technology, we suggest you schedule a meeting with a program counselor to determine how program changes may affect course requirements. We recommend that you bring a copy of your previous curriculum worksheet and a transcript.

Transfer Students and Advanced Standing Credits

If you are transferring from a community college, junior college, technical institute, or other college or university, you may transfer applicable credits toward the degree requirements of a program in the School of Engineering Technology.

If you are admitted with transfer or advanced standing credits from another institution, you must meet the requirements for admission as set forth under the regulations stated. (See "Degree Candidates.") Advanced standing in the School of Engineering Technology may be obtained by transfer of credits, proficiency examination, or by completing the College Level Examination Program (CLEP).

Transfer of Credits

You may receive, subject to the approval of the Academic Standing Committee, credits for academic work completed in other approved schools, colleges, or universities if the following criteria are met: the content of the course being submitted is equivalent to that of the corresponding School of Engineering Technology course; the grade achieved in the course submitted is C or higher; and the remoteness of the time of study does not negate its use as a prerequisite for an advanced course.

If you desire advanced standing credits by transfer, you must file a petition for transfer credit. You should request the registrar of the institutions previously attended to mail an official transcript to the School of Engineering Technology office, 120 Snell Engineering Center, Boston, Massachusetts 02115.

Proficiency Examinations

If you are a degree candidate in good academic standing and you do not meet all the criteria for the normal transfer of credits but are able to supply evidence of sufficient knowledge of a technical subject, you may petition the Academic Standing Committee for a proficiency examination. After paying the proficiency examination fee and demonstrating proficiency as indicated by the examination, you will receive advanced standing credit.

College Level Examination Program

The School of Engineering Technology awards college credit under the College Level Examination Program (CLEP). This program is designed to enable individuals who have reached college-level education to demonstrate their achievement through testing and to receive college credit applicable toward a degree program. (The examination measures basic proficiency in the arts and sciences.) After paying the exam fee and receiving a passing score, you will be awarded advanced standing credits. For further information, contact the School of Engineering Technology, 617-437-2500.

Registration

Selecting Courses During Registration

Courses offered by the School of Engineering Technology are listed in the "Course Descriptions" section of this *Bulletin*. (See page 33.) Part of

each course's entry includes a listing of which quarters the course is offered. Because most courses are not offered every quarter, you should plan your course load for the entire academic year, not just the next quarter. Academic counseling is available to help plan your course load for the year. If you need help, contact a School of Engineering Technology program counselor at 617-437-2500.

Guidelines for Registering for Electives

Many of the School of Engineering Technology's degree programs require the completion of electives. The electives give you the chance to explore topics beyond the core curriculum's scope or to gain expertise in a specific area introduced by the core courses.

There are three categories of electives: open, technical, and social science/humanities.

Open Electives

Any course is acceptable as an open elective except physical education, military science, and preparatory courses. An open elective may be either a three or a four quarter-hour course.

Social Science/Humanities Electives

Social science/humanities electives are offered through University College and must be chosen from a list that is available from the School of Engineering Technology. Six quarter hours of the social science/humanities electives must be chosen from the speech communications (SPC) category.

Technical Electives

Technical electives must be chosen from the list of suggested technical electives appearing at the end of the degree curricula. Students wishing to take an upper-level course that does not appear on the list must petition for permission before attending the class. Students should submit a proposed program of elective courses for approval by the program coordinator. Electives preferably represent a minor field of concentration consistent with personal career objectives.

Registration Periods

Official registration periods are scheduled for each quarter during the academic year. We strongly recommend that you register for courses during these periods. The registration dates, times, and locations are listed in the enclosed Fee Schedule and Academic Calendar.

Before the registration period begins, get a copy of the *University College and School of Engineering Technology Schedule* for the next quarter. The *Schedule* provides you with the meeting times and locations of the courses being offered during the next quarter. To get a copy of the *Schedule*, contact the School of Engineering Technology at 617-437-2500.

Changes in Registration

You can change the courses you are registered in by filing a course drop form at the registrar's office, 120 Hayden Hall, and then registering for the desired course. We suggest that you make these changes during the official registration period, if possible.

Cross-Registration

Basic College students registering for School of Engineering Technology part-time courses may do so only to clear deficiencies or to follow a program approved by the appropriate program coordinator. Basic College students may register for part-time courses only by completing the registration form available in the School of Engineering Technology office by the end of the first week of the quarter. You must *not* fill out any other part-time registration materials. Approval of the program coordinator must be obtained if the course does not appear on your approved program sheet. Approval from the Department of Cooperative Education is required if you take more than one course during a co-op term. Upon completion, approval, and submission of the registration form, you will be registered automatically for the course. If the course is a substitute for a day course, the latest grade received is considered for quality-point calculations. If you do not appear on the part-time roster you will not be admitted into the class unless you have an approved registration form. In all instances, Basic College students must adhere to the academic and administrative requirements of the School of Engineering Technology part-time course.

Part-time School of Engineering Technology students who have been enrolled at Northeastern University for one or more quarters are eligible to register for a limited number of Basic College day courses. This policy is designed to accommodate previous School of Engineering Technology students who have experienced employment changes that make it impossible for them to continue part-time studies. If you are eligible, you

may register for eight quarter hours of day course credit per quarter for a maximum of three academic quarters. Since you will be a part-time evening student in Basic College courses, tuition, fees, student services, and space availability will be based on part-time rates and departmental policy. If you are interested, you must first determine if a specific course is offered in the University, complete the registration form in the School of Engineering Technology, and have the form approved in both the bursar's and registrar's offices. At this point the academic department will determine space availability.

Academic Standards

Campus Locations

All courses are offered at the main campus in Boston, with some courses available at the Suburban Campus, Burlington; Burlington High School; the Dedham campus; and Marlboro High School. Refer to the "Campus Maps" section. (See page 84.)

Quarter Calendar

Northeastern University operates on a quarter-system calendar. All courses are evaluated in terms of quarter-hour credit. A quarter-hour credit is equal to three-fourths of a semester-hour credit.

Class Session

Classes at Northeastern are scheduled in different modules. In assessing quarter-hour weight for courses, the following statement applies: One quarter hour of credit is equal to approximately fifty minutes of instruction per week, plus two hours of individual study.

Coursework

Various methods of instruction will be used in the course of your studies: lectures, home assignments, class projects, laboratory work, irregularly scheduled quizzes, and formal examinations. In addition, you will complete midterm examinations in most courses and a final examination at the completion of all courses. You are responsible for fulfilling all the

requirements of a course. In the event of absence, you must make appropriate arrangements for makeup with the instructor.

Attendance

Chronic absence from regularly scheduled sessions in any subject, for whatever reason, may seriously jeopardize your academic progress and status. You are expected to attend all sessions scheduled in your courses. Excessive absence during a quarter may be sufficient cause for the registrar to remove the course(s) from your schedule.

Withdrawal

Students who wish to withdraw from a course must complete a Course Drop Form, available at any campus location. Ceasing to attend classes or notifying the instructor does not constitute official withdrawal from a course. Students who withdraw from a course prior to the end of the seventh week of a term (please refer to the specific deadline in each *Schedule Guide*) will have no record of the withdrawal on their transcripts. Students may withdraw from the beginning of the eighth week to the end of the week prior to final examinations but the withdrawal will be noted on their transcripts. No withdrawals will be allowed for any reason during the week that final examinations are given.

In addition, the registrar will withdraw you from a course if you do not attend the first three classes at the beginning of a quarter or the first two classes at the beginning of a summer term.

Grading Systems

You are required to maintain appropriate grades, quality-point average, and the quantitative credit requirements of your program to satisfy academic progress criteria and graduate from the School of Engineering Technology.

The following grading system is used. The numerical equivalent for each grade is in parentheses.

A	(4.000)	Outstanding Attainment
A -	(3.667)	
B +	(3.333)	
B	(3.000)	Good Attainment
B -	(2.667)	
C +	(2.333)	
C	(2.000)	Satisfactory Attainment
C -	(1.667)	

D +	(1.333)	
D	(1.000)	Poor Attainment
D -	(0.667)	
F	(0.000)	Failure
I	-	Incomplete
L	-	Audit (No Credit)
S	-	Satisfactory achievement in a pass-fail course; counts toward total degree requirements
U	-	Unsatisfactory achievement in a pass-fail course
X	-	Incomplete in a pass-fail course
*	-	Grade not received

A general average of D is unacceptable and will not allow you to continue in the School of Engineering Technology or to receive a degree from Northeastern University. If you receive an F, you can clear the failure by repeating and passing the course.

Pass/Fail Courses

If you are a *degree candidate* in good academic standing and have completed forty quarter hours in a School of Engineering Technology degree program, you may register for one pass/fail course. Thereafter, you may register for one course on a pass/fail basis for each ten quarter hours of successfully completed work up to a maximum of nine quarter hours of pass/fail credit. You must obtain written permission from the appropriate academic dean or designee and approval of the instructor. You may not register for more than one pass/fail course per quarter. Pass/fail courses are restricted to social science/humanities electives only.

If you are a *nondegree candidate*, do not intend to become a degree candidate, and are making good academic progress, you may register for a course on a pass/fail basis with written permission from the appropriate academic dean or designee and approval of the instructor. You may not register for more than one pass/fail course per quarter.

If you become a degree candidate, you may use only nine quarter hours of social science/ humanities elective credit, where applicable.

Auditing a Course

You can audit courses by filing the usual registration forms and paying the regular tuition fees. There is no reduction in fees for auditing. Your decision to audit must be communicated in writ-

ing to the registrar prior to the fourth class meeting. As an auditor, you may participate in class discussion, complete papers and projects, and take tests and examinations for informal evaluation if desired. However, regardless of the amount or quality of work completed, *no academic credit will be granted at any time for courses audited.*

Makeup Examinations

Midterms

If you are absent from a midterm examination, you may petition for a makeup examination; you do not automatically have the right to make up a missed examination. You must file a petition for a missed midterm in accordance with the published schedule. Petitions may be obtained from the School of Engineering Technology office, 120 Snell Engineering Center, 617-437-2500.

If the petition is granted, you will be notified by mail when and where to make up the examination. All examinations are administered on the Boston campus. If you do not take makeup midterm examinations as scheduled you will forfeit the privilege. *There is no fee for a midterm makeup.*

Finals

If you are absent from a final examination, you will receive a grade of I (Incomplete) for the course. You do not automatically have the right to make up a missed final examination; you must file a petition for a missed final according to the published schedule. Petitions may be obtained from the School of Engineering Technology office, 120 Snell Engineering Center, 617-437-2500.

If the petition is granted, *you must pay a fee before taking the special examination.* (See enclosed Fee Schedule and Academic Calendar.)

You will be notified by mail when and where to take the final examination; all are administered on the Boston campus. If you do not take makeup final examinations as scheduled, you will forfeit the makeup privilege.

Grade Reports

The registrar's office will mail you a grade report that indicates both the quarterly quality-point average and the cumulative quality-point average. University regulations prohibit issuing grades by telephone.

Quality-Point Average

The quality-points you earn in a given course are determined on the basis of your letter grade and the credit hours carried by the course. The total quality-points earned, divided by the total number of credit hours, constitutes the quality-point average.

- 1. When you receive more than one grade in the same course, the most recent grade will be used to calculate a quality-point average.
- 2. A grade of I (Incomplete) will not be considered in the final calculation.
- 3. If you are a transfer student, you can receive advanced standing credits (ASC) for work completed at other institutions. While these credits count toward completion of credit requirements, neither the credits nor the grades earned in such courses are included in quality-point averages.
- 4. In programs made up of combined University College and School of Engineering Technology courses, your cumulative quality-point average will include all work in both colleges.

For example, if you have registered for thirteen courses, cleared a failure in one of them, cleared an incomplete in another by repeating the course, and received advanced standing credit in another, you may calculate the quality-point average as follows.

Grade Achieved	Numerical Equivalent		Credit Hours	Quality Points
A	4.000	×	4	= 16.000
A –	3.667	×	3	= 11.001
B +	3.333	×	3	= 9.999
B	3.000	×	4	= 12.000
B –	2.667	×	2	= 5.334
C +	2.333	×	2	= 4.666
C	2.000	×	4	= 8.000
C –	1.667	×	3	= 5.001
D +	1.333	×	2	= 2.666
D	1.000	×	3	= 3.000
D –	0.667	×	2	= 1.334
F	0.000	×	2	= 0.000
FB	3.000	×	3	= 9.000
I	–	×	–	= –
IC	2.000	×	2	= 4.000
ASC	–	×	–	= –
Totals			39	92.001

QPA = $\frac{\text{Total Quality Points (92.001)}}{\text{Total Credit Hours (39)}} = 2.359$

The registrar cannot confirm calculations of quality-point averages. Each student's record is updated before graduation. In the meantime, borderline cases can be checked by a School of Engineering Technology counselor.

Academic Progress Criteria

You are expected at all times to strive for a high record of achievement. The Academic Standing Committee reserves the right to review all students' records and deny readmission to those who fall below a minimum quality level of achievement. This requirement has been established as follows.

In order to remain in the college, you must have a quality-point average of 1.40 at the completion of twenty-four quarter hours; 1.50 at the end of forty-eight quarter hours; and 1.60 at the end of seventy-two quarter hours.

If you accumulate the equivalent of six uncleared failures, you may be considered ineligible to continue your program of study.

Scholastic Probation

The Academic Standing Committee has the authority to dismiss from the school or to place on scholastic probation any student whose scholarship is deficient because of a low quality-point average or excessive outstanding failures, regardless of quality-point average.

A student on scholastic probation should be particularly diligent in current course work and make every effort to clear the academic deficiencies as soon as possible. Students whose academic records do not improve or whose failures are not properly cleared may not be allowed to register for further courses.

A student on scholastic probation who has cleared all or a substantial part of any outstanding failures may petition the Academic Standing Committee for removal from the probation list.

Disciplinary Probation

The Academic Standing Committee has the authority to dismiss from the school or place on disciplinary probation any student who is deemed unworthy because of conduct or character. The committee may ask any student to withdraw from the school who is obviously out of sympathy with its aims and ideals.

Graduation Requirements

To receive the degree of associate in engineering, associate in science, or bachelor of engineering technology, you must meet the following requirements.

1. Formal acceptance into degree candidate status by the Committee on Admissions.
2. Completion of all curriculum courses, either by attendance at the School of Engineering Technology or by receiving advanced standing credit.
3. Completion of associate degree programs within eight years and bachelor's programs in twelve years from the date of entrance into the School of Engineering Technology (extensions of time may be granted by the Academic Standing Committee).
4. Attendance for at least a year preceding the expected graduation date, and completion of at least one-fourth of the work in the School of Engineering Technology.
5. Maintenance of a minimum quality-point average of 2.00 in all courses in the major and a minimum overall quality-point average of 2.00.
6. Completion of a minimum of thirty quarter hours of additional credit to be awarded more than one associate or bachelor degree.
7. Payment of the commencement fee. (See enclosed Fee Schedule and Academic Calendar.)
8. You must petition for transfer of credits completed at other institutions prior to January 1 of the year in which you are to receive the degree.

Dean's List Scholars

All matriculated students maintaining honor grade averages—a minimum quality-point average of 3.00 and no grades below C during a quarter, while carrying a minimum of eight quarter hours of credit—are recognized as Dean's List Scholars. If you want a certificate attesting to this honor, contact the School of Engineering Technology office.

Graduation with Honor

Bachelor's degree candidates who have superior achievement will be graduated with honor, high honor, or with highest honor, depending on the final quality-point average as follows.

Graduation with honor	3.25–3.49
Graduation with high honor	3.50–3.74
Graduation with highest honor	3.75–4.00

To be considered for graduation with honor, a student must have completed a minimum of 72 quarter hours of work at the School of Engineering Technology. Courses transferred from other educational institutions will not be considered in determining honor graduates.

Awards

University Awards

The University Awards are presented annually to seniors who have achieved high-ranking cumulative academic records. Certificates are awarded at the annual Class Day Ceremony.

Technology Awards

The Technology Awards are presented annually to seniors who have demonstrated superior academic and professional capabilities in their fields. Appropriate certificates are distributed to outstanding students enrolled in the following program categories.

Aerospace Maintenance Engineering
Technology

Computer Technology

Electrical Engineering Technology

Mechanical Engineering Technology

Mechanical-Structural Engineering Technology

Class Marshal Award

The Class Marshal Award is presented annually at the Class Day Ceremony to the top-ranking senior in a baccalaureate program. The award consists of a certificate and the President's Letter of Commendation.

Academic and Professional Awards

The academic programs offered by the School of Engineering Technology and the teaching, counseling, and professional efforts of the faculty and staff are aimed at motivating you toward the highest levels of academic achievement. To encourage scholarly and professional excellence and to recognize quality achievements, the following awards are made at appropriate times during the academic year.

Sigma Epsilon Rho Awards

This award is presented annually by Sigma Epsilon Rho, the evening colleges' scholastic honor fraternity. The highest-ranking students in University College and the School of Engineering Technology receive certificates and pins for outstanding scholastic achievement.

Tau Alpha Pi Awards

This award is presented annually by the Tau Alpha Pi National Engineering Technology Honor Society to recognize high scholastic achievement among students of the School of Engineering Technology. The award is intended to promote and encourage outstanding academic performance by offering membership in the society. Finally, the society hopes the award will strengthen the desirable qualities of personality, intellect, and character among its members. Inductees receive certificates and pins.

Alumni Award for Professional Promise

Established in 1947 by the Northeastern University Alumni Association, the Alumni Award for Professional Promise is presented annually at the Class Day Ceremony. The award is made to the senior who has demonstrated unusual professional promise through character traits, scholastic achievement, and professional performance.

science in engineering degree. For information, call the College of Engineering's student services office, 617-437-2154.

Educational Opportunities at Northeastern for Bachelor's Degree Graduates

Bachelor of engineering technology graduates who maintained a quality-point average (QPA) of 2.75 may be qualified to enter the College of Engineering's program leading to the bachelor of science in engineering degree. For information, call the College of Engineering's student services office, 617-437-2154.

Additional Opportunities at Northeastern

Educational Opportunities at Northeastern for Associate's Degree Graduates

Graduates of associate's degree programs in engineering technology or science technology programs may be able to transfer applicable credits toward the degree requirements of a baccalaureate program in engineering technology or industrial technology at Northeastern.

For information about transferring associate's degree credits toward an engineering technology bachelor's degree, call the School of Engineering Technology, 617-437-2500. For information about transferring associate's degree credits toward an industrial technology bachelor's degree, call University College, 617-437-2400.

In addition, engineering technology or science associate's degree graduates who maintained a quality-point average (QPA) of 2.75 may be able to transfer applicable credits toward a bachelor of

Financial Information

Tuition and Fees

This section contains a brief description of the fees and charges that the University assesses for instruction or other services. The actual fee amounts are listed in the enclosed Fee Schedule and Academic Calendar. If you do not have a Fee Schedule and Academic Calendar, you can request one by calling 617-437-2500.

Tuition rates, all fees, rules and regulations, courses, and course content are subject to revision by the President and the Board of Trustees at any time.

Registration and Tuition Fees

As a new student, you will be charged a one-time, nonrefundable registration fee. This fee is included in your tuition bill.

Students are permitted to audit courses, but there is no reduction in fees for auditing.

You may not attend class sessions or take any examination until you have paid your tuition or have made satisfactory arrangements for payment.

You will not be advanced in class standing, nor permitted to re-enroll in the University, nor have degrees conferred until all financial obligations to the University have been met.

If you are assigned to courses in other departments or colleges of the University, you will be charged tuition and other fees effective in those departments.

Deferred Payment Privilege

Occasionally situations develop, usually beyond the control of the student, that make it difficult to make regular payments. Under such circumstances, we recommend that you discuss the problem personally with the Office of the Bursar, where you can work out a convenient deferred payment agreement. A service fee is charged for this privilege. (See enclosed Fee Schedule and Academic Calendar.)

Late Payment Fee

A late payment fee is assessed on all accounts for failure to make payment or arrange for deferred payment by the bill due date.

Refund of Tuition

The general tuition refund policy in all schools and colleges of the University is as follows.

The University provides all instruction quarterly for which you must pay at the beginning of each quarter. Tuition refunds are granted for official withdrawal from a course through the first four weeks of a quarter.

Tuition refunds are granted only on the basis of the date appearing on the official withdrawal application filed with the registrar, 120 Hayden Hall. *Nonattendance does not constitute official withdrawal.* Requests for refunds must be made through the Office of the Bursar, 245 Richards Hall.

Refunds will be granted in accordance with the following schedule.

<i>Official withdrawal filed within</i>	<i>Percentage of tuition</i>
1st week of quarter	100%
2nd week of quarter	75%
3rd week of quarter	50%
4th week of quarter	25%
5th week or later	0%

Tuition Underwritten by Employers

If tuition is being paid directly by your employer to the University, you should give the Office of the Bursar a purchase order or a statement from an officer of the company, certifying that the company is underwriting the tuition.

Many companies, however, do not pay the University directly but will reimburse employees upon successful completion of each course. In such cases, you are responsible for payment in full at the start of each quarter.

You may choose to pay in installments on the deferred payment plan. However, tuition may not be left unpaid pending employer reimbursement.

Failure to make payments in accordance with these regulations will result in a late payment fee.

If you have any questions about student accounts, please direct them to the student account bursar, 245 Richards Hall, 617-437-2270.

Student Center Fee

If you attend the main Boston campus in the evening in a part-time program of study, you will be assessed a nominal student center fee.

Parking Registration Decal Fee

If you park in the Boston or Burlington campus lots, you must obtain a parking registration decal by the end of the second week of the quarter. You may pay the fee at the cashier's office, 248 Richards Hall, or at the Burlington campus cashier's office.

Medical Insurance

The Commonwealth of Massachusetts requires all Northeastern University students who are classified as full-time or enrolled in a degree program carrying nine or more credits to be covered by medical insurance. In compliance with the law, Northeastern University will automatically enroll you in its Blue Cross/Blue Shield plan and bill your student account for this coverage. The law allows you to waive the University's plan if you are covered by comparable medical insurance. Medical insurance waiver forms are available at the bursar's office, 245 Richards Hall.

Proficiency Examination Fee

Applicants may petition for advanced standing credit based on a "proficiency examination." There is a fee for each examination requested.

Graduation Fee

All candidates for associate's or bachelor's degrees must pay a graduation fee. The fee is billed whether or not you attend the Commencement Exercise.

Transcript Fee

You can obtain a transcript at the registrar's office, 117 Hayden Hall. There is no charge for an unofficial transcript. The official transcript fee is payable in advance at the cashier's office, 248 Richards Hall.

Textbooks and Supplies

You must purchase your own textbooks and work materials. The cost varies according to the subject. If you are enrolled in Engineering Graphics, you should be prepared to purchase drawing supplies and a set of drawing instruments, in addition to the textbooks.

Financial Aid and Scholarships

The Office of Financial Aid, located at 254 Richards Hall, offers several types of assistance to part-time students. All awards are based on financial need. Aid granted from programs sponsored by the federal government is dependent upon the amount of funding allocated to Northeastern University.

Pell Grants

The Pell Grant Program is a federal aid program designed to provide financial assistance to deserving students who wish to attend post-high school educational institutions. Pell Grants may be combined with other forms of aid in order to meet the full costs of education. The Pell Grant is an award and, unlike a loan, does not have to be repaid. A half-time student taking at least six credit hours each quarter and who is a United States citizen or an eligible noncitizen may apply. Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190, or by writing to the Pell Grant Processing Center, P.O. Box 4152, Iowa City, Iowa 52244.

Stafford Loans

A Stafford Loan (formerly known as a Guaranteed Student Loan) is a low-interest loan made by a lender such as a bank, credit union, or savings and loan association. This is not a grant; you must repay this money. To be eligible, you must be enrolled at least half-time (six to eight QHs) in a degree or certificate program. You are required to file a Financial Aid Form (FAF) and a Part-Time Financial Aid Application. Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190.

Massachusetts Adult Learners Grant

This program provides assistance to Aid for Families with Dependent Children (AFDC) recipients. To be eligible, you must have been a permanent legal resident of Massachusetts for at least one year prior to receiving the award, and you must be enrolled as an undergraduate student taking at least three quarter hours. You must file a Financial Aid Form (FAF). Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190.

Massachusetts Part-Time Grant

To be eligible for a Part-Time Grant, you must have been a permanent legal resident of Massachusetts for at least one year prior to the opening of the academic year as well as a United States citizen or eligible noncitizen. You must be enrolled for at least three but fewer than twelve undergraduate quarter hours. In addition, you must be enrolled in a degree or certificate program. If you are not so enrolled or if you have a prior bachelor's degree, your eligibility is restricted to a total of fifteen quarter hours.

You must file a Part-Time Undergraduate Application with the Office of Financial Aid and a Financial Aid Form (FAF) with the College Scholarship Service. Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190.

State Grants

If you are a Massachusetts resident taking at least twelve quarter hours for three of the four academic quarters, you should apply for a Massachusetts State Scholarship. The application is the Massachusetts Financial Aid Form. Applications are available in the Office of Financial Aid, 254 Richards Hall, 617-437-3190.

Community Sources

Students and their families are urged to explore community, industrial, and foundation sources for collegiate financial aid. Parents' employers or the appropriate union organization may be a source. In addition, local, civic, political, religious, or educational leaders are often aware of

aid sources in the immediate community. Some typical sources include PTA, Kiwanis, Lions, Elks, Knights of Columbus, Masons, Sons of Italy, Rotary, State Rehabilitation, or the American Legion.

Veterans' Benefits

Veterans covered by the Veterans Readjustment Act of 1966, Public Law 89-358, should report to 126 Hayden Hall to fill out the proper enrollment forms. Benefits depend on course load and increase sharply when a student takes more than eight quarter hours per quarter.

Students needing additional information as to eligibility, allowances, or other details are urged to contact the local office of the Veterans Administration or the Veterans' Benefits Representative at 126 Hayden Hall, 617-437-2283.

Scholarships and Application Procedures

The School of Engineering Technology and University College scholarships and awards that follow are available to students who have been accepted as degree candidates and are in good academic standing.

Scholarships are awarded once a year by the Scholarship Committee. Final selection of scholarship recipients is usually made in late May, followed by the awarding of the scholarships in late June or early July. Funds are usually applied to tuition expenses for the following academic year. Awards range in amount from \$250 to \$700.

In January, a mailing list of students who have requested applications is prepared, and applications are mailed out with the stipulation that they be completed and returned to the Scholarship Committee's director's office by March 31. To be placed on the January mailing list, call 617-437-2400 and leave your name, address, and student ID number.

Leslie B. Cutler Aviation Scholarship Awards

Established by the members of the Aero Club of New England in recognition of the late Senator Cutler's service and devotion to the interests of aviation, these awards are made to students who most typify the same interest, devotion, and leadership demonstrated by Senator Cutler during her long and distinguished public career.

Henry J. Doherty Memorial Scholarship Fund

Established in 1987 through the generosity of Doris R. Doherty as a tribute to her late husband, a 1953 graduate of the School of Business' evening program and a successful business leader in legal publishing. The income from the scholarship is awarded annually to deserving students with demonstrated financial need who are pursuing part-time evening study and have been accepted as degree candidates.

Kappa Tau Phi Scholarships

Granted annually to those women students in the arts and sciences, business, and engineering programs who rank highest at the end of the upper-middle year. If the chosen student is eligible for an award of greater monetary value, the award will be made to the next highest-ranking woman student. To be eligible for this scholarship, the student must be enrolled in a program of at least two evenings per week and must be a candidate for the bachelor's degree. In determining the recipient, grades of all courses completed in prior years shall be considered.

Robert G. Keene Memorial Scholarship Fund

Established in 1979 in memory of Robert G. Keene, a graduate of Lincoln College, now the School of Engineering Technology, Class of 1972, the endowment funds were provided by the friends and associates of Robert G. Keene and the Polaroid Corporation, where he served as an engineering manager. The income from the fund is awarded annually to an undergraduate in any college of the University who demonstrates financial need as well as strong character and initiative. Primary consideration will be given to children of Polaroid employees.

Martin Luther King, Jr., Scholarships

Established in 1969 in memory of the late Rev. Martin Luther King, Jr., awards are made, as openings occur, to minority-group adults who would otherwise be unable to continue their education. Stipends will cover tuition expenses not to exceed six quarter hours in any academic quarter (excluding the summer quarter).

William J. McGovern Memorial Scholarship

Established in 1978 by an anonymous donor who wishes to assist others in realizing their potential through higher education and to honor the memory of William J. McGovern. The income from this scholarship will benefit worthy undergraduate students actively pursuing studies in the School

of Engineering Technology or University College. Recipients must be matriculated, demonstrate financial need and academic achievement, and exhibit a high level of professional promise.

Sigma Epsilon Rho Honor Society Scholarship Award

Established in 1974 by the membership of the society, income from the fund is awarded annually to undergraduate student(s) of the School of Engineering Technology and/or University College at Northeastern University. Eligible students must have a cumulative quality-point average of 3.00 or better after completing 75 percent or more of the required studies.

H. Patricia Taylor Scholarship Fund

Established in 1974 by H. Patricia Taylor, a graduate of University College, and her husband, Harry C. Taylor, a graduate of the School of Business, the scholarship expresses their appreciation for financial assistance made available to Mrs. Taylor while obtaining her degree, and is an attempt to provide similar funds to assist others in realizing potential through higher education. The income from the scholarship fund will be awarded annually to a student enrolled in University College or the School of Engineering Technology who demonstrates financial need and academic stability and who meets certain other conditions of eligibility.

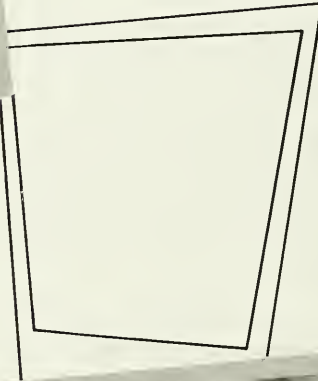
University College and the School of Engineering Technology Faculty Society Memorial Scholarship Awards

The Faculty Society of University College and the School of Engineering Technology offer two awards annually, primarily for excellence in studies, to bachelor's degree candidates in University College and the School of Engineering Technology who have carried and are currently carrying a minimum of twenty-four quarter hours annually. Applications, available during the winter quarter must be returned before the spring quarter. These awards are given in commemoration of the Faculty Society's deceased members.

Mark Caldwell Whitney Memorial Aviation Scholarship Fund

Established in 1981 by the family and friends of the late Mark Caldwell Whitney, an outstanding 1973 graduate of the Aeronautical Technology Program. Income from the fund is awarded annually to a student with financial need who exemplifies Mr. Whitney's love of flying and commitment to excellence in the aviation field.

Appendix



Faculty

A listing of the School of Engineering Technology's faculty follows.

David J. Allen, MSCE

Assistant Professor
Computer Technology

Robert B. Angus, Jr., MS

Assistant Professor
Electrical Engineering Technology

David S. Goldman, MS

Associate Professor
Computer Technology

John E. Hajjar, PhD

Assistant Professor
Computer Technology

Eric W. Hansberry, MS

Assistant Professor
Design Graphics

George F. Kent, MS, MBA, PE (MA, CT)

Visiting Associate Professor
Mechanical Engineering Technology

Nonna K. Lehmkuhl, MEd, MS

Program Coordinator and Assistant Professor
Computer Technology

Ernest E. Mills, MS, PE

Associate Professor
Mechanical Engineering Technology

Frederick J. Nohmer, EdD

Assistant Professor
Electrical Engineering Technology

Thomas E. Phalen, MS, PE

Professor
Mechanical Engineering Technology

Ronald E. Scott, ScD

Professor
Electrical Engineering Technology

A listing of the School of Engineering Technology's part-time faculty follows. Each entry gives the faculty member's name; highest degree earned; professional affiliation; and University title, department, and year of appointment.

Arnold Aaron, PhD

Engineering, Naval Underwater Systems Center
Senior Lecturer, Electrical Engineering Technology (1974)

Velda Adams, MS

Principal Engineer, Digital Equipment Corp.
Lecturer, Computer Technology (1980)

Arnold W. Almquist, MEd

Mathematics Instructor, Needham High School
Senior Lecturer, Mathematics (1967)

Francis M. Antczak, BSEE

Senior Engineer, Mass. Electric Co.
Lecturer, Electrical Engineering Technology (1985)

Philip H. Anthes, MBA

Retired
Associate Lecturer, Computer Technology (1985)

John C. Balsavich, AS

Laboratory Supervisor, Electrical Engineering, Northeastern University
Senior Lecturer, Electrical Engineering Technology (1957)

Henry G. Barry, MEd

Retired
Lecturer, Mathematics (1979)

Matteo P. Berardi, MS, PE

Technical Specialist, Impell Corporation
Senior Lecturer, Mechanical Engineering Technology (1960)

Maureen P. Berggren, BS

Mathematics Teacher, Quincy High School
Senior Lecturer, Mathematics (1965)

Wayne M. Bethoney, BS

Mechanical Engineer, AMMRC
Lecturer, Mechanical Engineering Technology (1982)

Robert E. Bobeck, MEd

Professor, Bristol Community College
Senior Lecturer, Engineering Graphics (1976)

Edward Bobroff, BSME

Test and Start-up Manager, Cogeneration
 Management/Harvard University
*Senior Lecturer and Program Consultant,
 Mathematics (1946)*

Azzouz Boulenouar, MSEE

Lecturer in Mathematics, Northeastern University
Associate Lecturer, Computer Technology (1987)

Richard P. Brennan, BSEE, BSCS

Consultant
Associate Lecturer, Computer Technology (1986)

Donald C. Brock, MS

Mathematics Instructor, Needham High School
Senior Lecturer, Mathematics (1965)

Kip A. Brown, BS

Programmer/Analyst, United States Department
 of Transportation
Lecturer, Computer Technology (1982)

Thomas J. Bugos, PhD

Software Engineer, Prime Computer
Lecturer, Computer Technology (1985)

Maria F. Burgess, MSIS

Administrative Assistant, Tel America
 Electronics, Inc.
Associate Lecturer, Computer Technology (1988)

Vincent K. Butler, MS

Assistant Manager, New England Telephone
Lecturer, Computer Technology (1982)

Joseph M. Cardito, PhD, PE, CHP (American Board of Health Physics)

Supervisor, Nuclear Fuels and Data Systems,
 Stone & Webster Engineering Corp.
*Lecturer, Mechanical Engineering
 Technology (1978)*

Robert W. Case, PhD

Coordinator for Day Program, School of
 Engineering Technology
Senior Lecturer, Mathematics (1976)

Walter J. Casey, MEd, MAT

Mathematics Teacher, Brighton High School
Senior Lecturer, Mathematics (1955)

Joan M. Chrusciel, MEd, MA

Mathematics Department Head, Quincy High School
Lecturer, Mathematics (1980)

Vincent L. Cocco, BS

Senior Engineer, Polaroid Corp.
Lecturer, Engineering Graphics (1978)

Wendell R. Collymore

Electronic Engineering Design CAD/CAM,
 Polaroid Corp.
Senior Lecturer, Engineering Graphics (1976)

Richard J. Colvario, MEd

Senior Analyst/Data Administrator, Massachusetts
 Department of Revenue
Associate Lecturer, Computer Technology (1987)

Thomas R. Connolly, BET

Controls and Instruments Engineer,
 General Electric Co.
Lecturer, Electrical Engineering Technology (1985)

Roger T. Connor, MEd

Mathematics Teacher, Milton Academy
*Senior Lecturer and Course Consultant,
 Calculus (1953)*

Robert J. Cormier, BS

Site Planner and Land Architect, Self-employed
*Lecturer, Architectural Engineering Technology
 (1984)*

James B. Corscadden, MEd, AMT

Principal, Ellis Mendell School
Senior Lecturer, Mathematics (1967)

William L. Crenshaw, MSME, PE

Research Mechanical Engineer, Army Materials and
 Mechanics Research Center
*Lecturer, Mechanical Engineering
 Technology (1978)*

David C. Crockett, MS

Senior Engineer, Raytheon Co.
*Senior Lecturer, Mechanical Engineering
 Technology (1969)*

Gregory Czarnowski, MEd

Consultant, Marketing and Advertising
*Lecturer and Course Consultant, Technical
 Communications (1982)*

Thomas R. Deveney, MA

Principal, Thomas J. Kenny School
Senior Lecturer, Mathematics (1965)

Jane E. DeVoe, MA

Lecturer in Mathematics, Northeastern University
Lecturer, Mathematics (1980)

Douglas H. Diamond, BSEE

Program Manager, Analytical Systems
 Engineering Corp.
Senior Lecturer, Mathematics (1968)

Raffaele Di Cecca, MA, MS

Assistant Professor, Wentworth Institute
 of Technology
Lecturer, Mathematics (1982)

Giles C. Dilg, MSEE, PE

President, Giles Dilg Co.

*Senior Lecturer, Computer Technology (1966)***Mark Domaszewicz, MSEE**

Senior Engineer, Raytheon Co.

*Senior Lecturer, Mathematics (1970)***Leonard F. Dow, MS, PE**

Staff Engineer, Boston Edison Co.

*Senior Lecturer, Electrical Engineering Technology and Course Consultant, Circuit Analysis (1970)***David P. Durant, MEd, MS**

Teacher, Boston Latin School

*Lecturer, Mathematics (1983)***Henry B. Eden, BA**

Vice-President, Tech-Graphics

*Senior Lecturer, Engineering Graphics (1957)***Peter A. Eggleston, MS**

Senior AI Systems Engineer, Textron Defense Systems

*Associate Lecturer, Computer Technology (1987)***Walter E. Engstrom, MS**

Physics Instructor, Braintree High School

*Lecturer, Physics (1985)***Adolf J. Erikson, MBA, PE (Mass.)**

President, A.E. Engineering Corp.

*Senior Lecturer, Engineering Graphics (1966)***Gordon C. Estabrooks, MA, MEd**

Science Teacher, Boston Latin School

*Lecturer, Physics (1983)***Andreas L. Evriviades, MA**

Teacher of Mathematics, Milton Academy

*Lecturer, Mathematics (1983)***Thomas C. Fantasia, MSEE**

Power Coordinator, Boston Edison Co.

*Lecturer, Electrical Engineering Technology (1981)***Edwin H. Farr, PhD**

Mathematician, RJO Systems Engineering

*Associate Lecturer, Mathematics (1980)***William D. Finan, DED**

Retired

*Senior Lecturer and Course Consultant, Mathematics (1946)***John M. Flaherty, BS, PhD**

Consultant

*Lecturer, Electrical Engineering Technology (1976)***James J. Flannery, MS**

Manager, Computer Applications, Boston Edison Company

*Associate Lecturer, Electrical Engineering Technology (1980)***Donald W. Fogg, MSEE**

Senior Engineering Scientist, General Electric Company

*Associate Lecturer, Electrical Engineering Technology (1989)***Constantine Fountzoulas, PhD**

Research Associate, Center for Electromagnetic Research, Northeastern University

*Lecturer, Mechanical Engineering Technology (1985)***John J. Fraizer, BS**

Retired

*Lecturer, Physics (1981)***Thomas G. Fratto, AM**

Mathematics Teacher, Cambridge Rindge and Latin School

*Associate Lecturer, Computer Technology (1987)***Kenneth W. Gagnon, BS**

Laboratory Supervisor, Massachusetts Department of Public Safety

*Senior Lecturer, Physics (1977)***Hassan N. Gharavy, MSEE**

Assistant Professor, Mass Bay Community College

*Associate Lecturer, Computer Technology (1986)***Bernard F. Goldstein, PhD**

Manager/Controls, Dynamics Research Corp.

*Senior Lecturer, Electrical Engineering Technology (1974)***Boris Gommerstadt, PhD**

Associate Professor, Northeastern University

*Lecturer, Mechanical Engineering Technology (1984)***Philip R. Haberstroh, MSED**

Registrar, Boston Latin School

*Lecturer, Mathematics (1981)***W. Dale Hall, SB, PhD**

Member, Technical Staff, MITRE Corp.

*Lecturer, Mathematics (1981)***Gerald D. Halstead, MSEE**

Technical Staff, GTE Government Systems

*Lecturer, Electrical Engineering Technology (1985)***Francis A. Hankard, MS,**

Retired

*Senior Lecturer and Program Consultant, Physics (1946)***Lewis H. Holzman, MSCE, RLS**

Consultant, Computer Department, Stone & Webster Engineering Corp.

Senior Lecturer, Computer Technology (1966)

Daniel H. Hornbarger, MS

Director, Government Programming Systems
Division, Blue Cross
Associate Lecturer, Computer Technology (1986)

Ronald L. Jackson, MS

Senior Engineer, Missile Systems Division,
Raytheon Co.
*Associate Lecturer, Electrical Engineering
Technology (1987)*

Charles E. Jacob, MEd, MLS

Teacher, Clarence Edwards School
Senior Lecturer, Physics (1967)

John Joseph Joyce, MEd, MA

Mathematics Teacher, Winchester High School
Lecturer, Mathematics (1983)

John Kaczorowski, MSEE

Assistant Director, Northeastern University
*Senior Lecturer and Program Coordinator, Electrical
Engineering Technology (1970)*

Stephen M. Kane, EdD

Associate Professor, Co-op Education,
Northeastern University
Associate Lecturer, Mathematics (1987)

Amin Karimpour, MSEE

Assistant Professor, Franklin Institute of Boston
Associate Lecturer, Computer Technology (1989)

William F. Kasting, MSEE

Systems Engineer, Raytheon Missile Systems
Lecturer, Electrical Engineering Technology (1984)

John G. Kelly, BS

Associate, The Wyatt Co.
Lecturer, Computer Technology (1983)

George F. Kent, MS, MBA, PE (MA, CT)

Visiting Associate Professor, Mechanical
Engineering Technology
*Senior Lecturer and Course Consultant,
Materials (1962)*

David E. Kentley

President/Treasurer, D-Five Associates Inc.
Lecturer, Electrical Engineering Technology (1985)

John J. Klein, MSEE

Retired
*Senior Lecturer, Electrical Engineering
Technology (1949)*

Peter L. Kobs, MS

Writing Consultant, Digital Equipment Corp.
*Associate Lecturer, Technical
Communications (1987)*

Joseph C. LaCroix, CAGS

Chair, Mathematics Department, Boston
Latin School
Senior Lecturer, Mathematics (1974)

James E. Lennox, MS

Senior Engineer, Textron Defense Systems
Associate Lecturer, Computer Technology (1988)

Alvin J. Lesieur, MEd

Training Director, Instron Corp.
Senior Lecturer, Engineering Graphics (1965)

Demetre P. Ligor, MSEE, PE

President, Applied Measurements, Inc.
*Senior Lecturer and Associate Program Consultant,
Physics (1959)*

John F. Limongelli, BSEE

Consultant
*Associate Lecturer, Electrical Engineering
Technology (1988)*

Warren J. Little, MS

Technical Staff, Charles Stark Draper Labs., Inc.
Senior Lecturer, Physics (1966)

Guido W. Lopez, MS

Lecturer, Northeastern University
*Associate Lecturer, Mechanical Engineering
Technology (1988)*

John F. Lutkevich, BBA

Engineer-in-Charge, GTE Sylvania
Senior Lecturer, Engineering Graphics (1956)

Eliot A. Madow, BET

Projects Director, Retrieval Technologies
Associate Lecturer, Computer Technology (1985)

James T. McGrath, MA, MS, MS, MS

Teaching Assistant, Northeastern University
*Associate Lecturer and Course Consultant,
Mechanical Engineering Technology
Laboratories (1986)*

Carl J. Mellea, MS, PE (MA, RI, ME, VT, NH)

Project Engineer, Howard, Needles, Tammen
& Bergendorff
*Senior Lecturer, Civil Engineering
Technology (1960)*

Louis A. Moore, BSCE, RLS

Chief Engineer, Commonwealth of Mass., Land
Court, Boston
*Senior Lecturer, Civil Engineering
Technology (1972)*

Wassim G. Najm, MSEE

Teaching Assistant, Northeastern University
*Associate Lecturer, Electrical Engineering
Technology (1985)*

Robert B. Nilsen, MS
Engineering Manager, Polaroid Corporation
Associate Lecturer, Manufacturing Engineering Technology (1989)

Yesugey Oktay, MS, PE (MA, NY, CA, ME)
Division Head, Mechanical & Structural Engineering, Boston Edison Co.
Senior Lecturer, Civil Engineering Technology (1970)

Masoud Olia, MS
Lecturer, Northeastern University
Associate Lecturer, Mechanical Engineering Technology (1986)

Douglas J. Ordway, MEd
Computer Coordinator, Boston Latin School
Senior Lecturer, Computer Technology (1975)

Francis A. Pepicelli, BS
Engineer, Northrop Corp.
Senior Lecturer, Mechanical Engineering Technology (1976)

Walter J. Phinney, MBA
Engineering Manager, Raytheon Missile Division
Lecturer, Engineering Graphics (1977)

Dominic A. Piccione, MS, PE (MA, VA)
Senior Engineer, Stone & Webster Engineering Corp.
Senior Lecturer, Mechanical Engineering Technology (1966)

Richard H. Pike, MBA
Lecturer, Northeastern University
Senior Lecturer, Industrial Engineering (1980)

Norman C. Poirier, MS, PE
Research Associate, Northeastern University
Senior Lecturer, Telecommunications (1966)

Dennis D. Poulin, MS
Senior Engineer, Hewlett Packard
Associate Lecturer, Electrical Engineering Technology (1989)

Donald J. Poulin, BSIT, PE
Retired
Senior Lecturer, Electrical Engineering Technology (1970)

Daniel W. Pratt, MS
Mathematics Department, Boston Latin School
Senior Lecturer and Course Consultant, Mathematics (1967)

Charles H. Price, Jr., MSEE
Technical Staff, MITRE Corp.
Senior Lecturer and Course Consultant, Electrical Engineering Technology (1960)

Robert Rancourt, MSEE
Electrical Engineer, MITRE Corp.
Lecturer, Mathematics (1984)

James F. Regan, MSCE, PE (MA, ME, NH, VT, CT, RI, NY, NJ, PA, FL, VA, DC)
President, J. F. Regan Engineers, Inc.
Senior Lecturer, Civil Engineering Technology (1972)

Edward P. Ricupero, MEd
Head of Mathematics Department, Everett High School
Lecturer, Mathematics (1983)

Robert J. Ritchie, BS
Computer Graphics Supervisor, Boston Edison Co.
Lecturer, Engineering Graphics (1980)

Robert A. Rosenberg, ScD
Engineering Consultant, Stone & Webster Engineering Corp.
Senior Lecturer, Mechanical Engineering Technology (1983)

Eric A. Roy, MEd, MA
Senior Teacher, Don Bosco Technical High School
Senior Lecturer, Mathematics (1967)

Thomas E. Ruden, MS
Principal Engineer, Raytheon Co. Labs
Senior Lecturer, Physics (1967)

Annino D. Salvucci, AS
Staff Engineer, Honeywell Inc.
Lecturer, Engineering Graphics (1983)

Leo D. Salvucci, MEd, MST
Mathematics Teacher, Boston Latin School
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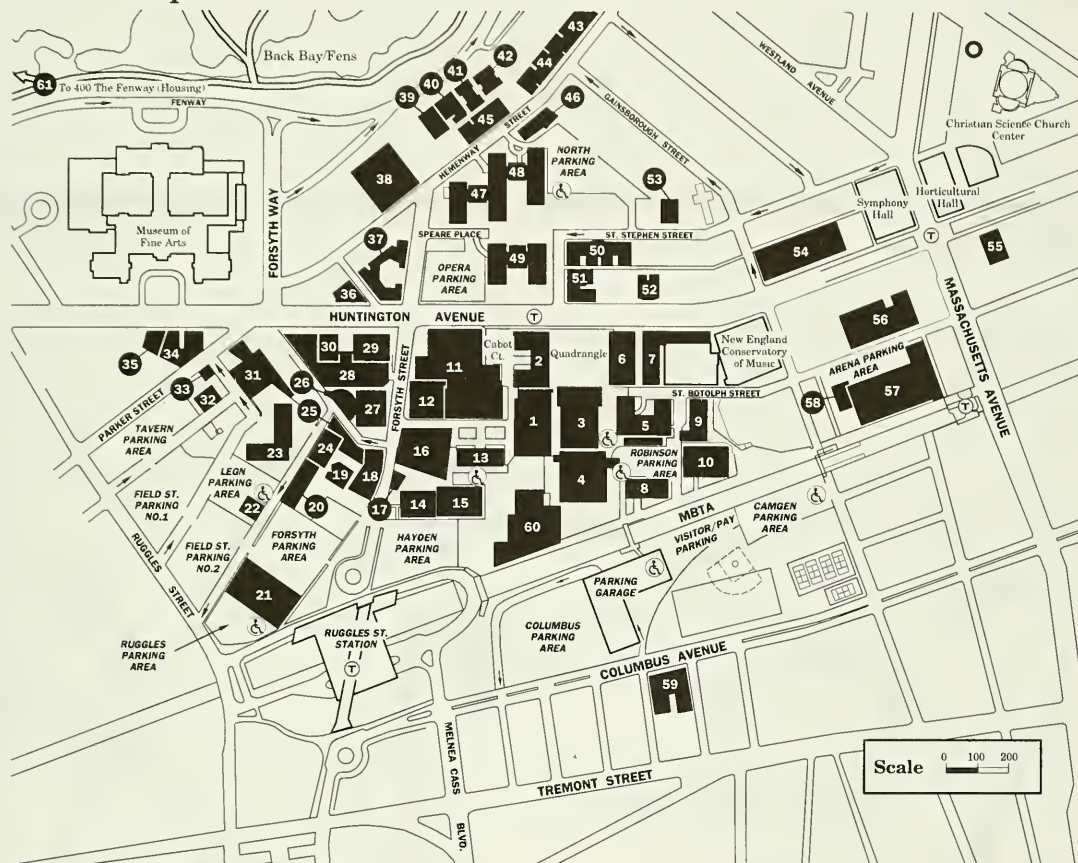
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Campus Maps

Access to Boston



Main Campus



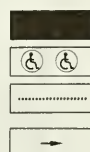
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- 22 African-American Institute (AF)
- 12 Barletta Natatorium (BN)
- 19 Boiler Plant
- 7 316 Huntington Ave.
(Northeastern at the YMCA)
- 11 Cabot Physical Education Building (CB)
- 39 Cahners Hall (CA)
- 28 Cargill Hall (CG)
- 13 Churchill Hall (CH)
- 59 Columbus Place
(716 Columbus Avenue) (CP)
- 56 Cotting School (CT)
- 9 Cullinane Hall (CN)
- 40 Cushing Hall (CU)
- 14 Dana Research Center (DA)
- 27 Dockser Hall (DK)
- 6 Dodge Building (DB)
- 3 Ell Student Building (Auditorium) (EL)
- 4 Ell Student Center (Student Lounge) (EC)
- 16 Forsyth Building (FR)
- 17 Forsyth Building Annex (FA)
- 38 Forsyth Dental Building (FE)
- 1 Hayden Hall (HA)
- 33 Hillel-Frager (HF)
- 24 Holmes Hall (HO)
- 55 236 Huntington Avenue (HU)

- 54 Huntington Plaza
(271 Huntington Avenue) (HN)
- 10 Hurtig Hall (HT)
- 26 Kariotis Hall (KA)
- 41 Kerr Hall (Faculty Center) (KH)
- 29 Knowles Center (Gryzmish Hall) (KG)
- 29 Knowles Center (Volpe Hall) (KV)
- 25 Lake Hall (LA)
- 60 Library (LR)
- 57 Matthews Arena (MA)
- 58 Matthews Arena Annex (MX)
- 20 Meserve Hall (ME)
- 5 Mugar Life Science Building
(Peabody Health Professions Center) (MU)
- 18 Nightingale Hall (NI)
- 31 Parker Building (PA)
- 5 Peabody Center
- 2 Richards Hall (RI)
- 8 Robinson Hall (RB)
- 21 Ryder Hall (RY)
- 15 Snell Engineering Center (SN)
- 50 122 St. Stephen Street (SS)
- 30 Stearns Center (ST)
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- Handicap Routes
- Street Direction

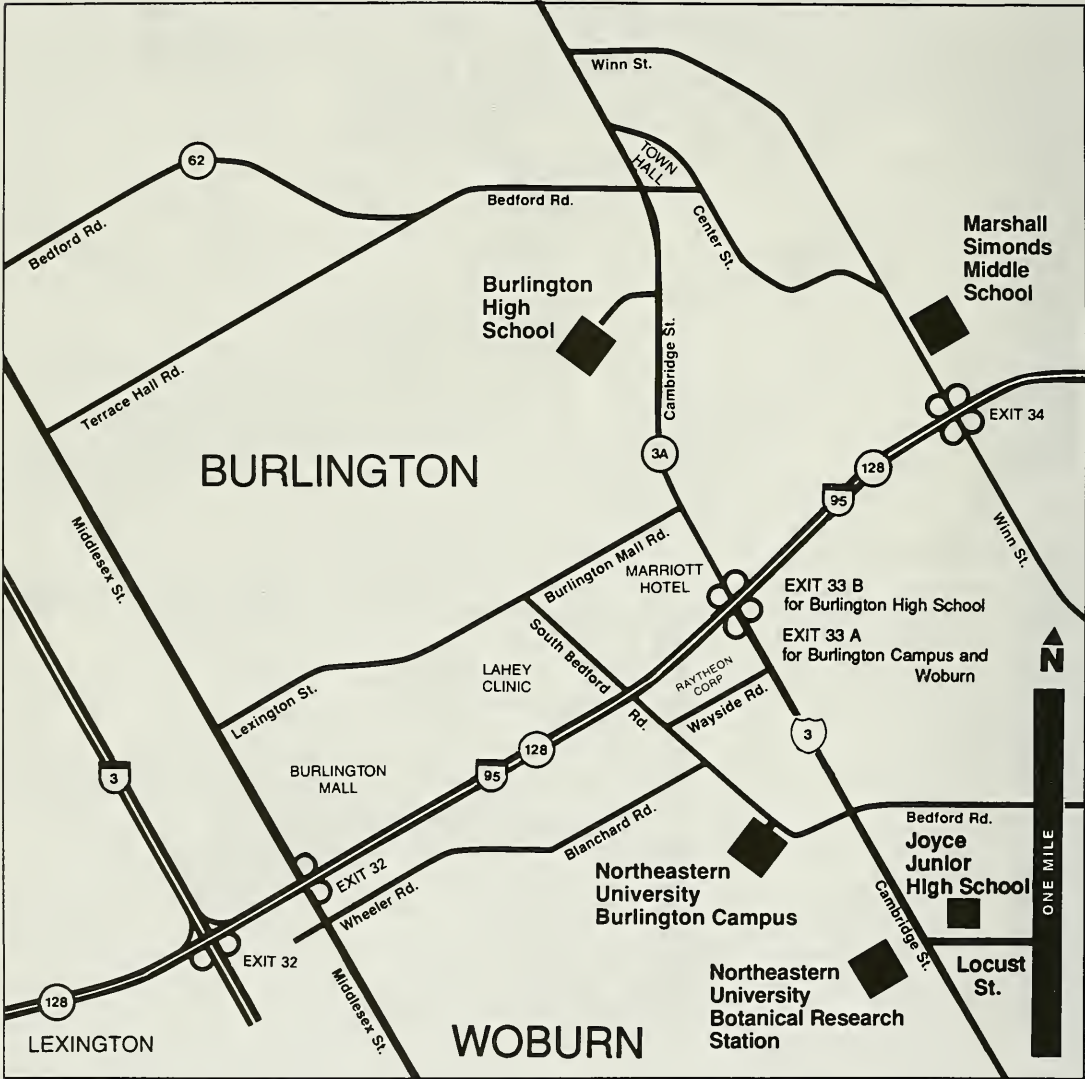


Maps are provided by the Information Center 115 Richards Hall, extension 2736. Some buildings on this map are used but not owned by Northeastern University. 3/90

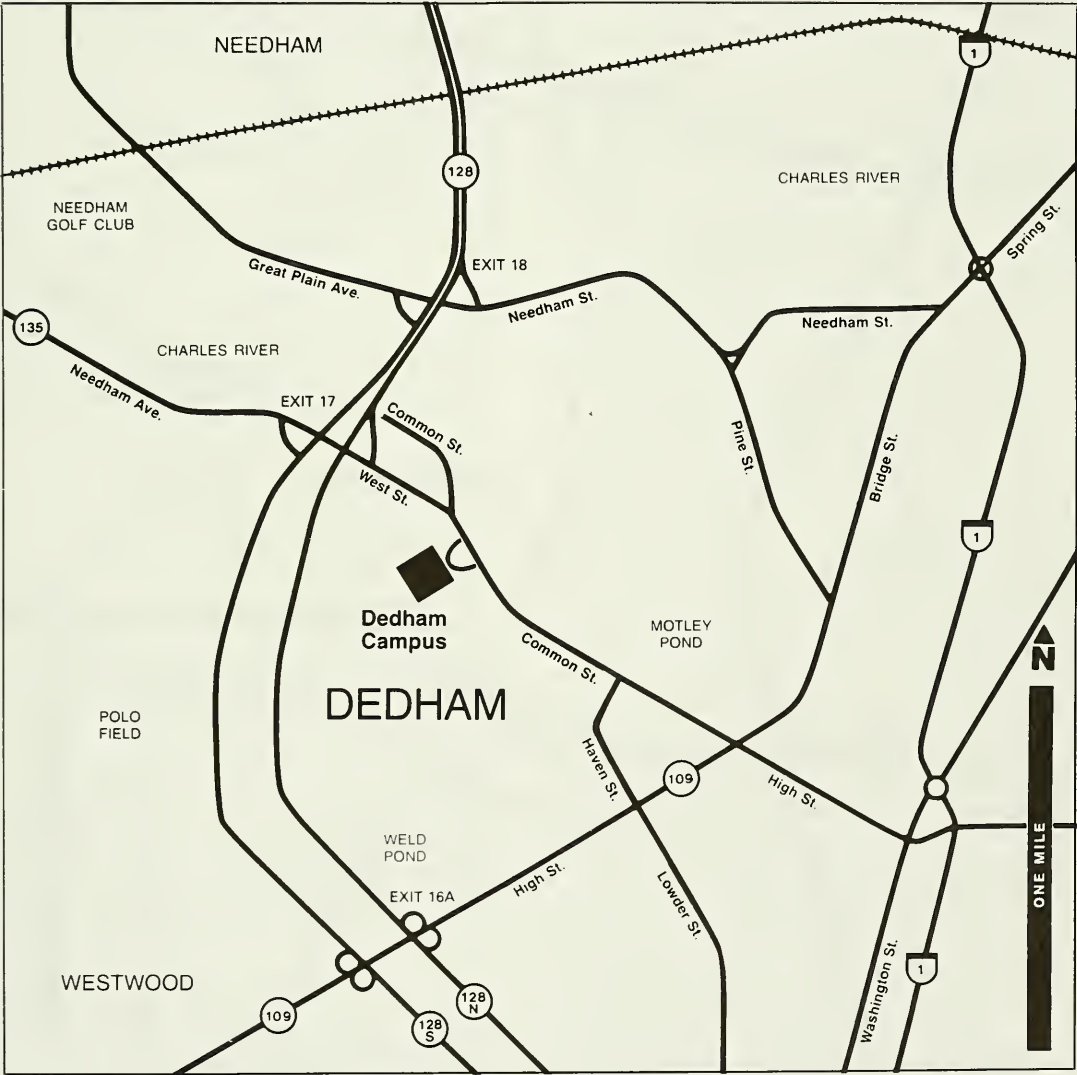
Residence Buildings

- 34 Burstein Hall
- 51 337 Huntington Ave.
- 43 Kennedy Hall
- 46 142-148 Hemenway Street
- 45 153/157-163 Hemenway St.
- 36 407 Huntington Ave.
- 52 319 Huntington Ave.
- 41 Kerr Hall
- 53 Light Hall
- 42 Melvin Hall
- 35 Rubenstein Hall
- 44 Smith Hall
- 48 Speare Hall
- 48 Stetson East
- 47 Stetson West
- 50 106/110/116/122 St. Stephen St.
- 23 Willis Hall
- 37 White Hall
- 7 316 Huntington Ave.
(Northeastern at the YMCA)
- 61 400 The Fenway

Burlington



Dedham



Marlboro



Mission

Northeastern University's mission, as a large urban university founded on the cooperative model of education, is to provide individuals with the opportunity for upward mobility through excellence in education. The University achieves its mission through curricula that value equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction.

Achieving Northeastern University's mission requires excellence in teaching, and teaching remains the central activity of Northeastern's faculty. By offering undergraduate and graduate programs that are rigorous, relevant, and rewarding, the University provides a solid structure for educational excellence. Northeastern University is also committed to the search for knowledge through the scholarly and artistic undertakings of its faculty and students.

A central mandate of Northeastern University is to offer students the opportunity to apply directly lessons of the classroom and laboratory to the workplace through cooperative education. For three quarters of a century, cooperative education has been the keystone of Northeastern's uniqueness.

Northeastern University is committed to serving the educational needs of a diverse student population in an amenable physical environment. The University believes that its mission can be achieved only if the student body is not limited by economic status, cultural or racial background, geographic origin, sex, or age.

Looking beyond the confines of the campus, Northeastern University is determined to maintain and strengthen its reputation as a friend to the City of Boston and a partner of the Commonwealth of Massachusetts. Through its numerous outreach programs, the University has made striking contributions to the community in the applied social sciences, in high technology, and in the arts. Northeastern University will continue to contribute in these and other ways to the region's overall quality of life and to its economic vitality.

Accreditation Statement

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc., a non-governmental, nationally recognized organization whose affiliated institutions include elementary schools through collegiate institutions offering post-graduate instruction.

Antidiscrimination Policy

Northeastern University is committed to a policy of equal opportunity for all students and employees without regard to race, color, religion, sex, sexual preference, national origin, handicap, or veteran status. The University prohibits discrimination in all matters involving admission, registration, and all official relationships with students, including evaluation of academic performance.

Delivery of Services

The University assumes no liability, and hereby expressly negates the same, for failure to provide or delay in providing educational or related services or facilities or for any other failure or delay in performance arising out of or due to causes beyond the reasonable control of the University. Such causes include, without limitation, power failure, fire, strikes by University employees or others, damage by the elements, and acts of public authorities. The University will, however, exert reasonable efforts, when in its judgment it is appropriate to do so, to provide comparable or substantially equivalent services, facilities or performance, but its inability or failure to do so shall not subject it to liability.

The Northeastern University catalog contains current information regarding the University calendar, admissions, degree requirements, fees, and regulations, and such information is not intended to be and should not be relied upon as a statement of the University's contractual undertakings.

Northeastern University reserves the right in its sole judgment to promulgate and change rules and regulations and to make changes of any nature in its program, calendar, admissions policies, procedures and standards, degree requirements, fees, and academic schedule whenever it is deemed necessary or desirable, including, without limitation, changes in course content, the rescheduling of classes, cancelling of scheduled classes and other academic activities and requiring or affording alternatives for scheduled classes or other academic activities, in any such case giving such notice as is reasonably practicable under the circumstances.

Northeastern University will do its best to make available to you the finest education, the most stimulating atmosphere and the most congenial conditions it can provide. But the quality and the rate of progress of your academic career is in large measure dependent upon your own abilities, commitment, and effort. This is equally true with respect to professional advancement upon completion of the degree or program in which you are enrolled. The University cannot guarantee that you will obtain or succeed at any particular job; that will depend upon your own skills, achievement, presentation, and other factors such as market conditions at that time. Similarly, in many professions and occupations there are increasing requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These may change during the period of time when you are at Northeastern and they may vary from state to state and from county to county. While the University stands ready to help you find out about these requirements and changes, it is your responsibility to initiate the inquiry because the University has no other way of knowing what your expectations and understandings are.

In brief, the University is there to offer you educational opportunities and choices and to assist you in finding the direction in which you want to steer

your educational experience. But you are a partner in this venture with an obligation and responsibility to yourself.

Emergency Closing of the University

Northeastern University has made arrangements to notify students, faculty and staff by radio when it becomes necessary to cancel classes because of extremely inclement weather. AM radio stations WBZ (1030), WEEI (590), WHDH (850), WRKO (680), and FM stations WBCN (104.1), and WROR (98.5) are the stations authorized to announce the University's decision to close. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operate when the University is closed.

Equal Opportunity Employment Policy

Northeastern University is an equal opportunity employer. It is institutional policy that there shall be no discrimination against any employee or applicant for employment because of race, color, religion, sex, sexual preference, age, national origin, handicap, or veteran status.

Northeastern University also prohibits discrimination against any employee regarding upgrading, demotion or transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training. In addition, Northeastern adheres to Affirmative Action guidelines in all recruitment endeavors.

Further, Northeastern will not condone any forms of sexual harassment which is defined as the use of sexual advances, requests for favors, and other verbal or physical conduct of a sexual nature, as an explicit or implicit condition of employment, as the basis for employment decisions, or to interfere with an individual's work performance by creating an intimidating, hostile, or offensive work environment.

Inquiries concerning our equal opportunity policies may be referred to the University Title IX Coordinator/Compliance Officer for Section 504 of the Rehabilitation Act of 1973, Office of Affirmative Action, Richards Hall, 617-437-2133.

Family Educational Rights and Privacy Act

In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it is necessary to do so. Specific details of the law as it applies to Northeastern are printed in the Student Handbook and are distributed annually at registrations of the University College and graduate schools.

Fee Schedule and Academic Calendar

The Fee Schedule and Academic Calendar has been enclosed as a separate insert to this *Bulletin*. If one has not been enclosed, contact the School of Engineering Technology, 617-437-2500.

Full-Time and Day Programs

This *Bulletin* contains information about the evening and weekend programs offered by the School of Engineering Technology. If you need information about full-time or day programs offered by Northeastern University, contact the Department of Undergraduate Admissions, 139 Richards Hall at 617-437-2200.

Insufficient Enrollment Disclaimer

Northeastern University reserves the right to cancel any course if minimum enrollments are not met.

Office of Services for the Handicapped

The Office of Services for the Handicapped (OSH) provides a variety of support services and general assistance to all of Northeastern's disabled students and employees. The University's efforts to comply with section 504 of the Rehabilitation Act of 1973 are coordinated by Ruth Bork, OSH director, 5 Ell Center, 617-437-2675. (TTY number is 437-2730.)

Policy on Changes of Program

The School of Engineering Technology reserves the right to cancel, modify, or add to the courses in any curriculum. The University further reserves the right to change the requirements for graduation. Any changes that may be made from time to time relative to this policy shall be applicable to all students in the school, college, or department concerned, including former students who may reenroll.

Tuition and Fees Policy

Tuition rates, all fees, rules and regulations, courses and course content are subject to revision by the President and the Board of Trustees at any time.

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